The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 106, No. 6 CHICAGO, ILLINOIS FEBRUARY 8, 1936

ETIOLOGY AND DIAGNOSIS IN HYPERPARATHYROIDISM

A REVIEW OF ONE HUNDRED AND THIRTY-FIVE PROVED CASES

RUSSELL M. WILDER, M.D.
AND
LLEWELYN P. HOWELL, M.D.
Fellow in Medicine, the Mayo Foundation
ROCHESTER, MINN.

Askanazy [1] in 1904 suspected a relationship between the parathyroid glands and the decalcification of the skeleton in a case of osteitis fibrosa; Erdheim [2] in 1907 commented on the frequency of occurrence of hypertrophy of these glands in cases of osteomalacia, and Hoffheinz [3] in 1925 noted the occurrence of decalcifying disease of the skeleton in twenty-seven of forty-five instances of enlarged parathyroid glands. However, the primary significance of tumors of the parathyroid to the skeletal lesion of generalized osteitis fibrosa was not recognized before Mandl's [4] operative removal in 1925 of an adenomatous parathyroid gland and the alleviation thereby of the metabolic abnormalities in a case of this disease. Mandl's only rivals for the honor of originality are Schlagenhaufer [5] and Weil.[6] The former in 1915, apropos of two cases of this disease, in which tumorous parathyroid glands were discovered at necropsy, questioned the opinion, current at that time, that enlargement of parathyroid glands was a secondary phenomenon, a result and not the cause of decalcification, and recommended in advanced cases exploration and the removal of tumors if found. Weil in 1922 administered roentgen therapy to the neck in a case of generalized osteitis and obtained what he reported as remarkable benefit.

In the decade that has now passed since Mandl made this discovery, the number of reported cases of what is now known as hyperparathyroidism has increased considerably. Castleman and Mallory [7] found the growing list to contain 160 cases, and to this they added twenty-five cases. However, fifty-five of the cases in their list antedated the report of Mandl's case and some of the cases they included were not clearly cases of hyperparathyroidism.

Gutman, Swenson and Parsons [8] a year ago collected 115 cases reported since Mandl's case. We have reviewed the literature and are willing to accept 135 reported since the date of Mandl's publication. The minimal criteria for acceptance in our compilation have been (1) that the report of the case has appeared in the literature, (2) that the description of the skeletal abnormality present be consistent with that of generalized osteitis fibrosa or, in the absence of skeletal abnormality, that indisputable abnormality of calcium metabolism, characteristic of hyperparathyroidism, has been demonstrated by the study of the blood or urine, and (3) that a tumorous enlargement, either adenoma of one or more parathyroid glands, or diffuse hypertrophy and hyperplasia of the entire parathyroid apparatus, has been found, either by operation or by necropsy. Our personal experience leads us to believe that cases which do not meet these criteria, with very few exceptions, are not cases of this disease.

The small number of these proved cases that we have been able to encounter in the clientele of the Mayo Clinic has been a cause of chagrin to the several members of the staff of the clinic who have been interested in the disease ever since one of us (Wilder) reported one of the first cases in which operation was successfully performed.[9] The operation was performed by Rankin. While only five "proved" cases can be credited to the Mayo Clinic, twenty-one have been reported by the English writers, chiefly from London, and twenty-five from one hospital in Boston. We have chided ourselves with negligence and with lack of clinical acumen, but it does not seem probable that many cases have escaped us. Those of the staff who have had experience with the condition have been called into consultation on a great many suspicious cases, and in no less than thirteen doubtful cases a surgical exploration of the neck has been resorted to. In no instance in which the clinical diagnosis was in doubt has this exploration yielded any evidence of hypertrophy or hyperplasia of the parathyroid glands, and in only one case, in which there was good clinical evidence of hyperparathyroidism, has exploration failed to reveal a tumor.

We have not been willing to diagnose hyperparathyroidism in senile osteoporosis, hypertrophic arthritis, Paget's disease, multiple myeloma and other clinical

From the Division of Medicine, the Mayo Clinic.

Read before the American Association for the Study of Goiter, Salt Lake City, June 24, 1935.

1. Askanazy, Max: Ueber Ostitis deformans ohne osteides Gewebe, Arb. a. d. Geb. d. path. Anat. **4**: 398-422, 1904.

2. (a) Erdheim, J.: Ueber Epithelkörperbefunde bei Osteomalacie, Sitzungsb. d. k. Akad. d. Wissensch. Math.-naturw. Cl. **116**: 311-370, 1907; (b) Ueber den Kalkgehalt des wachsenden Knochens und des Callus nach der Epithelkörperexstirpation, Frankfurt. Ztschr. f. Path. **7**: 175-230, 1911; (c) Rachitis und Epithelkörperchen, Vienna, 1914; (d) Pathologische Anatomie bei Rachitis und Osteomalazie, Wien. klin. Wchnschr. **41**: 1544 (Nov. 1) 1928.

3. Hoffheinz: Ueber Vergrösserungen der Epithelkörperchen bei Ostitis fibrosa und verwandten Krankheitsbildern, Virchows Arch. f. path. Anat. **256**: 705-735, 1925.

4. Mandl, Felix: Therapeutischer Versuch bei Ostitis fibrosa generalisata mittels Exstirpation eines Epithelkörperchentumors, Wien. klin. Wchnschr. **38**: 1343-1344 (Dec. 10) 1925; Klinisches und Experimentelles zur Frage der lokalisierten und generalisierten Ostitis fibrosa: Unter besonderer Berücksichtigung der Therapie der Letzteren, Arch. f. klin. Chir. **142**: 1-46, 1926; Therapeutischer Versuch bei einem Falle von Ostitis fibrosa generalisata mittels Exstirpation eines Epithelkörperchentumors, Zentralbl. f. Chir. **53**: 260-264 (Jan. 30) 1926.

5. Schlagenhaufer: Zwei Fälle von Parathyreoideatumoren, Wien. klin. Wchnschr. **28**: 1362 (Dec. 9) 1915.

6. Weil, cited by Lièvre.[10]

7. Castleman, Benjamin, and Mallory, T. B.: The Pathology of the Parathyroid Gland in Hyperparathyroidism: A Study of Twenty-Five Cases, Am. J. Path. **11**: 1-72 (Jan.) 1935.

8. Gutman, A. B.; Swenson, P. C., and Parsons, W. B.: The Differential Diagnosis of Hyperparathyroidism, J. A. M. A. **103**: 87-94 (July 14) 1934.

9. Wilder, R. M.: Hyperparathyroidism: Tumor of the Parathyroid Glands Associated with Osteitis Fibrosa, Endocrinology **13**: 231-244 (May-June) 1929.

entities which a few members of the profession, without good evidence it seems to us, have attributed to overfunction of the parathyroid glands. However, we have not been unaware of the fact that in early cases abnormalities may be revealed in calcium metabolism or by the presence of renal stones before recognizable lesions have occurred in the skeleton, and also that occasionally a skeletal picture resembling that of Paget's osteitis deformans may be superimposed on one characteristic of von Recklinghausen's disease. The original case of Mandl, to judge by recent reexaminations of the patient by Bauer,[10] Kienböck[11] and Mandl[12] seems to present an instance of this imposition of one disease on the other.

For reasons now to be given, it is suggested that the relative scarcity of cases of hyperparathyroidism in the clientele of the Mayo Clinic may be accounted for by an unequal distribution of this disease and that its incidence may be greater in some parts of the world than elsewhere. The experience in the Mayo Clinic is not different from that of other clinical centers in the same region. David Barr[13] of Washington University School of Medicine in St. Louis has been puzzled at the rarity of cases of hyperparathyroidism in his community. Barr,[14] it will be recalled, reported the first proved case in the United States[15] and was the first to use the designation "hyperparathyroidism."

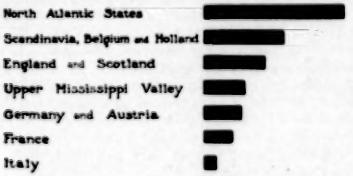


Fig. 1.—Distribution of reported "proved" cases of hyperparathyroidism. Incidence per hundred million of population.

He has written extensively on the subject and is an acknowledged authority, yet he and his associates are credited with reporting only four "proved" cases. He has told us that he has obtained determinations of serum calcium in many cases of urolithiasis without uncovering a single instance of hyperparathyroidism. Boyd[16] and his associates in Iowa City and Compere[17] in Chicago, who were among the first to recognize cases in America, have been able to report no further cases. Compere has written that he too is surprised at the number of cases found in the East.

When we arrange by regions the 135 cases accepted in our compilation, we find (chart 1) that forty-one come from the North and Central Atlantic States, twenty-one from England and Scotland, twenty-one from Austria and Germany, eighteen from Scandinavia and the Netherlands (Sweden, Norway, Denmark, Holland and Belgium), twelve from the Upper Mississippi Valley, nine from France, and four from Italy. The populations of these respective regions are roughly equal, with the exception that the region of Germany and Austria contains about twice as many people as the others. If we adjust the figures for the actual differences in population, we arrive at the following incidences for each 100,000,000 of population: North Atlantic States (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Delaware, Pennsylvania and Maryland) 113; North Sea States (Scandinavia, Holland and Belgium) 62.3; England and Scotland 49.8; Upper Mississippi Valley (Ohio, Indiana, Illinois, Michigan, Wisconsin, Missouri, Iowa, Minnesota, Kansas, Nebraska, South Dakota and North Dakota) 31.2; Germany (including Austria) 29.2; France 21.5; Italy 9.5.

We recognize that the number of cases is small for final conclusions in the matter of regional distribution, that some cases which we have omitted for lack of criteria of "proof" may be cases of hyperparathyroidism, and that other cases have been recognized here and there but not reported. It is to be supposed, however, that the unproved or unreported cases are distributed among the regions named in about the same proportions as the "proved" and the distribution of the "proved" cases is certainly too irregular to be satisfactorily explained either by coincidence or by the supposition that more active and more general interest in the disease in Boston, London and Scandinavia has led to the recognition of a comparatively large number of cases in these regions. It must be remembered that the original discovery of the relationship of the parathyroid gland to the von Recklinghausen syndrome was made in Vienna and that the Austrian and German clinics are very alert to the condition; that in France there is a group of physicians, especially Léri,[18] Lièvre,[19] Leriche[20] and Jung,[21] who have been writing extensively on this subject, and that interest has not been lacking in Italy and Spain, to judge from the numerous titles in the literature. In its advanced form at least, and nearly all the "proved" cases have been well advanced, the disease is not difficult to recognize, and it is doubtful whether more than a very few of the cases in our compilation would have escaped receiving a correct diagnosis in any one of the principal clinics and hospitals in the several regions named.

Much evidence has been accumulated to indicate that lack of ultraviolet irradiation or deficiency of vitamin D is a very important factor in determining hyperplasia of the parathyroid glands. The evidence bearing on this has been principally presented in the communications of Nonidez and Goodale[22] and of Higgins and Sheard,[23] who have definitely established that deprivation of ultraviolet rays in chickens deprived of other sources of vitamin D leads to hypertrophy and hyperplasia of the parathyroid glands. One of us (Wilder)

10. Bauer, Julius: Ueber Hyperparathyreoidismus und verwandte Zustände, Beitr. z. klin. Chir. **159**: 583-596, 1934.
11. Kienböck, R.: Ueber die Pagetsche Knochenkrankheit und Epithelkörperchentumoren, Beitr. z. klin. Chir. **159**: 597-611, 1934.
12. Mandl, Felix: Authentischer Bericht über den ersten, mit Epithelkörperchenexstirpation behandelten Fall von Recklinghausenscher Knochenkrankheit, Beitr. z. klin. Chir. **160**: 295-301, 1934.
13. Barr, David: Personal communication to the authors.
14. Barr, D. P.; Bulger, H. A., and Dixon, H. H.: Hyperparathyroidism, J. A. M. A. **92**: 951-952 (March 23) 1929.
15. The diagnosis of the famous case of Captain Martel made by Dr. Eugene Du Bois in 1906 was the first clinical recognition of the condition in this country, but it was not until much later that the nature of the case was proved by the finding of a parathyroid tumor (Hannon, R. R.; Shorr, E.; McClellan, W. S., and Du Bois, E. F.: A Case of Osteitis Fibrosa Cystica (Osteomalacia?) with Evidence of Hyperactivity of the Parathyroid Bodies: Metabolic Study, J. Clin. Investigation **8**: 215-227 [Feb.] 1930).
16. Boyd, J. D.: Personal communication to the authors. Boyd, J. D.; Milgram, J. E., and Stearns, Genevieve: Clinical Hyperparathyroidism, J. A. M. A. **93**: 684-688 (Aug. 31) 1929.
17. Compere, E. L.: Bone Changes in Hyperparathyroidism, Surg., Gynec. & Obst. **50**: 783-794 (May) 1930; personal communication to the authors.
18. Léri, A., cited by Lièvre.[19]
19. Lièvre, J. A.: L'ostéose parathyroidienne et les ostéopathies chroniques, Paris, Masson et Cie, 1932.
20. Leriche, R., cited by Lièvre.[19]
21. Jung, Adolphe: Chirurgie des parathyroïdes, Paris, Brodard et Taupin Coulommiers, 1933.
22. Nonidez, J. F., and Goodale, H. D.: Histologic Studies on Endocrines of Chickens Deprived of Ultraviolet Light: I. Parathyroids, Am. J. Anat. **58**: 319-341 (Jan.) 1927.
23. Higgins, G. M., and Sheard, Charles: The Effect of Selective Solar Irradiation on the Parathyroid Glands of Chicks, Am. J. Physiol. **88**: 299-310 (May) 1928. Higgins, G. M.; Sheard, Charles, and Wilder, R. M.: The Effects of Ultraviolet Irradiation on Rachitic Chickens, Anat. Rec. **58**: 205-216 (Jan.) 1934.

V 106
1936

with Higgins and Sheard [24] showed that this hyperplasia could be prevented to some extent by injecting parathyroid extract in birds deprived of sunshine and vitamin D. The conclusion was reached that the ability of the parathyroids to increase the supply of their product represents a compensation mechanism which protects the organism against relative degrees of deficiency of vitamin D. It will be recalled that Erdheim in 1907 [26] considered that hyperplasia of the parathyroid apparatus in osteomalacia, and other decalcifying diseases of the skeleton, was in the nature of a compensation, although at that time vitamin D was still unknown.

The compensation for deficiency of vitamin D that is effected by hyperplasia of the parathyroids is usually not overdone; that is to say, the increased supply of hormone usually does not exceed the increased need for it. But occasionally, as previously suggested in one of Johnson's [25] papers, an overcompensation may occur, thus leading to the symptoms of hyperparathyroidism. A few instances of the disease in which diffuse hyperplasia of multiple glands has been found, as opposed to the more usual solitary adenoma, may be explained on this basis. Adenoma formation, we suggest, is to be attributed to embryonic cells or cell nests, which will be found only rarely in parathyroid glands, and then usually in only one gland. Deprivation of vitamin D, and stimulation thereby of the parathyroid apparatus, leads to the proliferation of such cells and thus to the formation of adenoma. The resulting tumor frequently possesses the power of making parathyroid hormone. If it does, its function will be without the restraint that regulates the normal glands, and thus it will provide a supply of hormone unrelated to the requirement of the body. The problem is analogous to that of adenoma of the thyroid gland. The deficiency of vitamin D places the parathyroid gland under stimulation, with the resulting development, in the occasional case, of adenoma; deficiency of iodine places the thyroid gland under stimulation with the resulting development, in some cases, of adenoma. The adenomas in both instances may or may not provide hormone. If they do, one encounters the symptoms of hyperparathyroidism on the one hand, or of hyperthyroidism on the other.

It may be asked why diffuse hypertrophy and hyperplasia of the entire parathyroid apparatus is not always found when vitamin D is deficient. The answer is that it always is found in chicks but that the parathyroid apparatus of the majority of men and women is capable of increasing its function without hypertrophy. The evidence of increased function in children deficiently supplied with vitamin D is provided by Hamilton and Schwartz.[26]

It may also be asked why a stimulus sufficient to provoke the proliferation of an embryonic cell nest into an adenoma does not cause diffuse hypertrophy of the other glands of the parathyroid apparatus. The reason is that the tumor, once formed and functioning, assumes the work of the entire apparatus and thus places the balance of the apparatus at rest. Evidence of the resting state of these other glands is provided by the temporary tetany that so frequently follows removal of a solitary parathyroid tumor.

This is as far as our present knowledge of the physiology of the parathyroid glands permits us to venture, but it is far enough to see that a difference in the supply of ultraviolet energy in two regions could be a factor in determining a different incidence of adenoma formation in the respective populations of these regions. The amount of sunshine in Spain and Italy is certainly greater than that in England and northern Europe, and the amount in the Upper Mississippi Valley, and more particularly in the plains regions of the Central West, from which come about 70 per cent of the patients of the Mayo Clinic, is greater than that in New England and New York. The annual mean cloudiness, as depicted by Ward [27] from the statistics of the United States Weather Bureau, is 50 per cent for the Upper Mississippi Valley, 48 per cent for the Northwestern plains states, and 41 per cent for the Central plains states. That for New England is 55 per cent. These differences are small, but they probably do not indicate the entire difference in the amount of ultraviolet rays received by the respective populations. The importance of haze, fog and smoke in the atmosphere has been emphasized by numerous writers on sunshine and vitamin D. Hill [28] commented that Birmingham, England, compared to Oxford, loses 41 per cent of sunshine in the winter, and Manchester, compared to Stonyhurst, 37 per cent. "What light does reach the citizen through his smoke-befouled atmosphere, he gets little of. Shutting himself up, as he does nearly all day, in close rooms, while engaged in sedentary occupations, such sunlight as he receives is filtered through glass and robbed of its ultraviolet rays." England and New England in which the incidence of hyperparathyroidism seems to be higher, are coastal regions with comparatively much haze and fog. England and New England also are industrial regions in which a relatively large part of the population lives indoors, in a smoky atmosphere. Italy and Spain and the Central states of the United States are regions of much less fog and haze; also they are to a much larger extent agricultural, with a population living outdoors more of the time and in an atmosphere that contains less smoke. The proportion of urban to rural inhabitants of the North Atlantic Coast states is 3.5 to 1; for the states west of the Mississippi River it is less than 1 to 1.

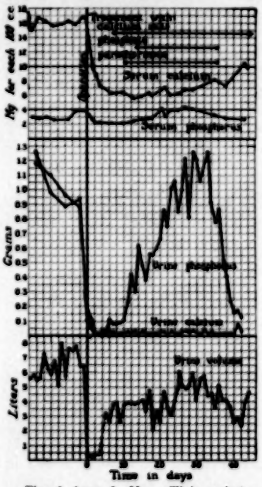


Fig. 2 (case 5, Mayo Clinic series).—Showing the precipitate drop in calcium in the blood and urine after operative removal of an adenoma of the parathyroid.

24. Wilder, R. M.; Higgins, G. M., and Sheard, Charles: The Significance of the Hypertrophy and Hyperplasia of the Parathyroid Glands in Rickets and Osteomalacia, Ann. Int. Med. 7: 1059-1069 (March) 19..4.
25. Johnson, J. L.: Experimental Chronic Hyperparathyroidism: IV. Effects of Administration of Irradiated Ergosterol, Am. J. M. Sc. 183: 776-784 (June) 1932.
26. Hamilton, Bengt, and Schwartz, Charles: Rickets and Hyperparathyroidism, J. Clin. Investigation 11: 817 (July) 1932.
27. Ward, R. deC.: The Climates of the United States, Boston, Ginn & Co., 1925.
28. Hill, Leonard: Sunshine and Open Air: Their Influence on Health, ed. 2, London, Edward Arnold & Co., 1925.

It is not to be supposed that deprivation of vitamin D is the only factor involved in this problem. The determining condition in adenoma formation must be the congenital structure of the organ involved and must depend on the presence or absence of cells that preserve into adult life an embryonic capacity for proliferation. If there are no such cells in a gland, no tumor will occur no matter how great the stimulation to which the gland is subjected; thus adenomas of the parathyroid glands can never occur in more than a small percentage of the population. However, this factor of potentiality to adenoma formation must affect the population of all regions equally; therefore it cannot be invoked to account for regional differences. As we see the situation, it is this: An equal number of persons in two regions are born with cells possessing special capacity for proliferation into tumors of the parathyroid glands. Whether or not tumor formation occurs depends on the intensity of the stimulation to which these cells are subjected. Therefore, in regions where the parathyroids are under more strain, more cases of tumor will come to view, while in other regions where the strain is less, fewer tumors will be seen. In neither region will the parathyroid glands be affected when they are not possessed of the potentiality in question, because, no matter what the degree of stimulation, they cannot respond in this manner. Thus workers in mines might receive no sunlight at all for years on end and develop no parathyroid tumor.

The point is that the lack of vitamin D can be sustained by most adult persons without harm but that the few in every population who possess the potentiality in question develop tumors of their parathyroid glands. The number of persons with this potentiality will represent the same very small percentage of all populations, but if the population of one region is exposed to more stimulation, the number of parathyroid tumors developing in that region will be greater. Analogy is again suggested with the thyroid problem. The majority of persons in the goiter belt resist the development of adenomas of the thyroid, even though they are exposed to the same environmental conditions as the persons who develop goiter. On the other hand, the number of adenomas of the thyroid that come to light in the goiter belt greatly exceeds the number found in other regions. The stimulation to adenoma formation, in the case of the thyroid, is a deficiency of iodine; with the parathyroid it is the deficiency of vitamin D.[29]

We believe this explanation is adequate to account for the relatively high incidence of hyperfunctioning adenomas of the parathyroid glands in regions such as England and New England, where the likelihood of deficiency of vitamin D is favored by the indoor life of large numbers of the population, and by the despoiling of what outdoor sunshine is received by its filtration through an atmosphere containing relatively larger amounts of haze, smoke and fog.

In addition to revealing this interesting regional distribution of "proved" cases of hyperparathyroidism, our study provides other information that may be of interest. We can review it only briefly now, for lack of space. It will be considered more fully by one of us (Howell) in a subsequent report. The range in age of the patients at the time of their examination is from 13 years to 74 years. Of males, the largest number has been in the fourth decade. Of females, the largest number is in the fifth decade.

Males numbered thirty-one, females ninety-nine, indicating the marked predilection of the disease for females. In five cases, reports of the sex of the patients were not given.

The past history of the patients is probably of more importance than has been recognized. The intake of calcium-containing food and the opportunity for absorption of ultraviolet rays seem not to have been inquired into in most cases. In the first example of the disease reported from the Mayo Clinic, the patient had received very little calcium-containing food and had spent most of her life indoors.

A story of renal colic, before the time of appearance of other evidence of disturbed calcium metabolism, was present in eighteen cases. An example is provided by the case from the Mayo Clinic reported recently by Brown,[30] Pemberton [31] and Camp.[32] The approximate duration of the disease from the time of onset of the first symptoms to the time when the diagnosis was established by the demonstration of enlarged parathyroid glands has varied from a few months to thirty-nine years. There is reason in many cases to believe that the course is intermittent; that periods of greater output of parathyroid hormone alternate with other periods of smaller output, thus causing exacerbations and remissions of the symptoms, and changes in concentration of blood calcium and in the calcium balance.

The most frequent complaint on the part of the patients has been pain in the lower extremities. This frequently is localized in the bones. Such pain, together with loss of tone of muscles, weakness and lassitude, was the outstanding symptom in the experimental hyperparathyroidism of a normal subject studied by Johnson and Wilder.[33] However, some patients seem not to have been seriously incapacitated until a fracture occurred, and other patients consulted their physicians because of a tumor of the bone (giant-cell tumor) or because of renal colic. A subsidiary complaint noted in twenty-five cases was polyuria.

The parathyroid tumor could be palpated in the neck in fifteen instances; but in many other instances a tumor palpated in the neck proved to be an adenoma of the thyroid, and the tumor of the parathyroid was found in deeper tissues. Tumors of the parathyroid glands are usually placed so deeply as to escape the fingers of the examiner. In the case reported by Brown [30] the tumor, because of its content of calcium, was revealed by the roentgenogram.

The abnormalities of the bones, their bending, shortening, fracture, cysts, and giant-cell tumors, and the roentgenologically more or less characteristic type of generalized osteoporosis, have been so fully and frequently described as not to require attention here. Diffuse calcification of the renal parenchyma has been noted at necropsy in several instances, and in at least one instance, reported by Albright [34] and his associates, has been intensive enough to show itself clearly in roentgenograms. Roentgenologic evidence of diffuse

29. It is possible that the actual deficiency is one of calcium. The supply of calcium received by most persons in their food is on the borderline of adequacy, so that deficiency of vitamin D may readily result in actual inadequacy of the calcium; therefore, deficiency of vitamin D is the factor with which we are most concerned.

30. Brown, A. E.: Hyperparathyroidism with Nephrolithiasis, Proc. Staff Meet., Mayo Clin. **10**: 417-421 (July 3) 1935.

31. Pemberton, J. de J., in discussion, Proc. Staff Meet., Mayo Clin. **10**: 423-424 (July 3) 1935.

32. Camp, J. D., in discussion, Proc. Staff Meet., Mayo Clin. **10**: 421-423 (July 3) 1935.

33. Johnson, J. L., and Wilder, R. M.: Experimental Chronic Hyperparathyroidism: Metabolism Studies in Man, Tr. A. Am. Physicians **46**: 162-170, 1931; Am. J. M. Sc. **182**: 800-807 (Dec.) 1931.

34. Albright, Fuller; Baird, P. C.; Cope, Oliver, and Bloomberg, Esther: Studies on the Physiology of the Parathyroid Glands: IV. Renal Complications of Hyperparathyroidism, Am. J. M. Sc. **187**: 49-65 (Jan.) 1934. Albright, Fuller, and Bloomberg, Esther: Hyperparathyroidism and Renal Disease, with a Note as to the Formation of Calcium Casts in This Disease, J. Urol. **34**: 1 (July) 1935.

V 106
1936

calcification of the kidneys frequently was obtained by Johnson in rats that had been given injections of parathyroid extract. The formation of renal pelvic stones seems to depend on the interplay of other factors, such as obstruction and infection. Thus Mandl and Uebelhör [35] not long ago caused renal pelvic stones to form in the pelves of guinea-pigs by injecting parathyroid extract and intermittently obstructing the flow of urine, whereas without such obstruction renal stone has not been observed in experimental animals. Pelvic stone has been detected in an impressively large number of human cases, as has been emphasized by the Boston writers.

One other topic should be mentioned briefly; namely, the tetany that is almost always observed in hyperparathyroidism when the offending hyperplastic parathyroid tissue is removed. The cases in which operation was performed, in our review, number 109, and in their reporting this tetany or an equivalent drop of blood calcium after operation is mentioned in forty-eight. The phenomenon is so characteristic that its absence gives reason to doubt the effectiveness of the operation, implying either that the diagnosis of hyperparathyroidism is wrong or that the surgeon has failed to find the offending tumor (chart 2). The phenomenon has been absent in those cases which we have found in the literature when the surgeon has removed one or two normal sized parathyroid glands in the expectation of affecting the course of diseases such as spondylitis, multiple myeloma, and Paget's osteitis deformans. In nearly all, if not all, of those cases the concentration of blood calcium was normal before operation and remained normal afterward. When true hyperparathyroidism has existed, even if the concentration of blood calcium was normal beforehand—and normal values for blood calcium have been reported in a number of the cases on record—operation has been followed one or two days later by a drop in the blood calcium, when this was studied, of at least 3 mg. per hundred cubic centimeters. Symptoms of tetany almost always accompanied this drop and their treatment with calcium was almost always necessary. The symptoms as a rule did not appear until the blood calcium had reached a value below 7 mg. per hundred cubic centimeters, but their development and severity depend more on the degree of the fall of the blood calcium than on the actual value to which it falls. Thus, in the case recently reported by A. E. Brown [30] the patient had tetany after operation when the concentration of blood calcium was 9 mg. per hundred cubic centimeters, but this concentration represented a drop of 5 mg. from the preoperative level.

In this discussion our attention has been limited to those features of hyperparathyroidism which bear on the problems of its etiology and diagnosis. So intriguing is the subject that knowledge about it has been acquired very rapidly. The disease is unusual, and yet, although barely ten years has elapsed since its essential pathogenicity was recognized, it is understood better than are many of the more common diseases. The examiner should avoid seeing hyperparathyroidism where it does not exist and be sparing of surgery unless the evidence establishes the diagnosis. Cases of true hyperparathyroidism are rare, especially in the Central West, where an abundance of ultraviolet radiation exists. They can easily be recognized by the diagnostic methods at hand, and while it is of the utmost importance to recognize them early, so that the patients may receive the unquestionable benefit that surgery has to offer them, this is no justification for resorting to surgery in cases that are not clearly instances of the disease.

35. Mandl, Felix, and Uebelhör, R.: Parathormon-Ostitis fibrosa-Nierenstein (Experimentelle Studie), Zentralbl. f. Chir. **60**: 68-70 (Jan. 14) 1933.

POST-TRAUMATIC NARCOLEPSY

GEORGE W. HALL, M.D.
AND
GEORGE B. LEROY, M.D.
CHICAGO

Reports of narcolepsy were infrequent prior to the World War compared with those which have appeared since the widespread epidemics of influenza and epidemic (lethargic) encephalitis. This observation applies similarly to cases of parkinsonism. Differences of opinion have existed as to what cases come within the term "narcolepsy" as first used by Gélineau [1] in 1880. The syndrome of pathologic sleep was brought to the attention of the medical profession by Westphal [2] in 1877 but was not defined as narcolepsy. Loewenfeld [3] in 1902 first recognized the significance of cataplexy as a symptom, while Henneberg [4] was the first to use the term "cataplexy." The first recognizable case of pathologic sleep was described by Charles Dickens in his Pickwick Papers in 1837, as depicted in his fat boy Joe, who went to sleep while serving the guests and on another occasion while masticating a large piece of pie, only to finish his task after being awakened by Mr. Wardle. Early writers regarded the syndrome of somnolence and cataplexy as a neurosis, while more recent observers believe that actual pathologic changes are present. Although many cases of the so-called idiopathic variety were described prior to the war, the majority of the post-traumatic cases have been reported since that time. In Daniels' [5] dissertation on narcolepsy a sharp distinction was made between cases in which head injury was merely a precipitating or incidental cause and others in which the trauma was a definite causative factor of the syndrome. It is questionable whether some cases are the sequel of trauma or of encephalitis. This is especially interesting since Osnato and Giliberti [6] have shown how the diffuse parenchymatous degeneration of the brain following head injury may closely resemble the lesion of encephalitis, of whatever cause. They have also demonstrated a similarity in the symptomatology of the early stages of head injury and the early phases of an acute encephalitis and have shown statistically the frequency of somnolence in the two classes.

The cases reported here are divided into two groups: Group 1 includes those presenting the two phases of the disease; namely, diurnal attacks of sleep and cataplexy, as described by Gélineau.[1] The term true narcolepsy is therefore limited to group 1:

CASE 1.—Singer, Kurt and Echter [7] report a case in which a man, aged 33, was thrown from a horse when he was 18 years

Read before the Section on Nervous and Mental Diseases at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 12, 1935.

1. Gélineau: De la narcolepsie, Gaz. d. hôp. **53**: 626 (July 8) 1880.
2. Westphal, C.: Eigenthumliche mit Einschlafen verbundene Anfalle, Arch. f. Psychiat. **7**: 631, 1877.
3. Loewenfeld, L.: Ueber Narkolepsie, München. med. Wchnschr. **49**: 1041, 1902.
4. Henneberg: Ueber genuine Narcolepsie, Neurol. Zentralbl. **35**: 282, 1916.
5. Daniels, L. E.: Narcolepsy, Medicine **13**: 1 (Feb.) 1934.
6. Osnato, Michael, and Giliberti, Vincent: Postconcussion Neuritis-Traumatic Encephalitis, Arch. Neurol. & Psychiat. **18**: 181 (Aug.) 1927.
7. Singer, Kurt and Echter: "Pseudo Narcolepsy," Ztschr. f. d. ges. Neurol. u. Psychiat. **36**: 278, 1917.

old. He struck the ground with the occiput and was unconscious for from one to two hours; there was no bleeding from the nose or mouth. Following the injury he complained of severe headaches, accompanied by somnolence, which occurred three or four times a day and was irresistible. He fell asleep while singing in the church choir, while dancing, and on several occasions during coitus. When he was in the army he would dream vividly of fighting the French and would jump out of bed. On another occasion he began singing "In der Heimat da ist es schoen" in his sleep. On the slightest surprise he would develop typical cataplectic attacks.

Case 2.—Redlich [8] reports a case in which a man, aged 21, had fallen from a sled when 14 years old, striking his forehead on the ice. The boy was unconscious for an unstated period after the accident, two teeth were knocked out, and there was bleeding from the nose and mouth. Several days after the injury the boy, who had been a good scholar, noted that he could not concentrate, that his memory was failing and that he would fall asleep frequently, even while walking. Occasional attacks of sleep lasted from one to two days. He was better in the winter and worse in the summer. Noting this, he developed the habit of putting cold water on his head to ward off the somnolence. Nocturnal sleep was normal. He had definite cataplectic seizures when he laughed heartily, falling as though shot but not losing consciousness. He took his illness much to heart and attempted suicide, but the revolver missed fire.

Case 3.—Haenel [9] reports a case in which a man, aged 39, suffered a severe head injury, followed at once by loss of consciousness and vomiting. Within a month of the injury, typical narcoleptic attacks appeared. The attacks were initiated by a great sense of weariness, the eyes would fall shut and the patient would sleep from ten to twenty minutes, awakening refreshed. The attacks occasionally came on so suddenly that the man was injured by falling. Later very typical attacks of cataplexy induced by different emotional reactions occurred. Every gradation of cataplexy from simple weakness to complete collapse occurred. The patient became irritable, nervous and sensitive and endeavored to resist emotional attitudes of all sorts. These, with the personality changes, distinguished the case in the author's estimation from the usual cases of narcolepsy.

Case 4.—Daniels [10] reports a case in which a man, aged 22, complained of frequent attacks of an irresistible desire to sleep, which had appeared shortly after a severe head injury six years previously. On the occasion of the injury, consciousness was completely lost for a few minutes, but mental confusion persisted for a week, and a retrograde amnesia for events immediately connected with the accident was still evident when the patient was admitted to the clinic. Changes in personality occurred: increased irritability, frequent outbursts of temper and lack of judgment. The patient stated that occasionally, when he was excited, strength seemed to leave his arms and legs momentarily. Ephedrine sulfate gave little relief, but encephalography, which revealed little of significance, was rapidly followed by a disappearance of the abnormal drowsiness.

Case 5.—Thiele and Bernhardt [11] report a case in which a man, aged 20, was thrown from a wagon, striking his head and losing consciousness for about fifteen minutes. Following the injury a severe headache developed, which recurred at frequent intervals. The patient had definite attacks of pathologic sleep and clear-cut attacks of cataplexy, which came on almost immediately following the injury. At no time did he lose consciousness during these attacks; he would remain prone for a few moments and then arise, saying "It is over."

Case 6.—Thiele and Bernhardt [11] also report a case in which a man, aged 39, was struck on the right temporal region by an iron bar and was unconscious for a brief period. For the week following the injury the patient was nervous, trembled continuously and slept at intervals about eighteen hours daily. The attacks of somnolence increased in frequency during the next two years, until he was having from three to thirty short attacks daily, of which he recognized two phases: one in which he slept for only a minute or so and the other precipitated by affective reactions, which resulted in a complete collapse of a few moments' duration.

We have recently seen a case belonging in group 1:

Case 7.—A man, aged 22, was knocked down by an automobile. The right side of his head was injured but he did not lose consciousness. Immediately after the accident he was able to go to his home alone, after a scalp wound had been dressed. He suffered from stiffness in the neck for a few days but otherwise felt normal. Within three weeks, attacks of drowsiness and diurnal sleep commenced and would occur several times daily. He slept for only a few minutes at a time while at his work, but on returning home he would sleep for two or three hours unless aroused. He fell asleep while eating at the table or when driving an automobile and even had a collision during such an attack. About a month after the onset of diurnal attacks of somnolence he had the first cataplectic seizure when he was startled by the noise from the horn of a passing car. He slumped in his seat and could not steer his car, and disaster was averted only by the quick action of his companion. A few hours later, while being greeted by relatives, he was so overjoyed that he slumped again to the ground, unable to speak or move for a few moments. The relatives thought he had had a petit mal attack. A day or two later a similar attack was initiated when he hooked a large bass while fishing with friends, who had to land his catch because of his temporary weakness. Like attacks have frequently occurred since that time on similar occasions. At another hospital he was studied, roentgenograms were made and a diagnosis of post-traumatic epilepsy was made; he was placed on a restricted fluid intake and phenobarbital to no avail. When examined by one of us (Hall) in September 1933 the pupils were equal and reacted to light and in accommodation; there was no nystagmus, and he did not complain of diplopia. The ophthalmoscope showed the fundi to be normal. The strength was good in both the upper and lower extremities; there was no ataxia of station or gait. All the deep reflexes were present and normal. The abdominal reflexes were normal. The roentgenograms taken at another hospital were examined and showed the sella to be normal with no evidence of skull fracture. A diagnosis of narcolepsy with cataplexy as the result of a cerebral trauma three weeks prior to the onset of the syndrome was made. The patient was given 25 mg. of ephedrine sulfate three times a day, and he has since been free of attacks as long as he takes the drug regularly. About nine months ago his medicine was finished and before he could procure another supply he fell asleep while wheeling sand in a wheelbarrow. He has returned to his former occupation of bank clerk and has no attacks as long as he takes the medicine regularly.

Group 2 includes cases presenting pathologic and paroxysmal attacks of somnolence only.

Thiele and Bernhardt [11] report a case in which a boy, aged 15, in a fit of despondency, shot himself in the right temple. Shortly after the injury attacks of somnolence developed. He fell asleep in theaters, while riding in street cars, and while standing, but at no time did he have cataplectic attacks.

Lhermitte [12] reports three cases. A man, aged 33, received a concussion as the result of a shell explosion. Three weeks later an irresistible desire to sleep developed. He fell asleep while walking and eating and was finally removed from his company with the diagnosis of drunkard. In the second case a man, aged 30, was shell-shocked, and five months later prolonged periods of diurnal sleep developed. The sleep was irresistible and the desire could not be overcome by mental effort. Eight months later convulsive attacks developed with loss of consciousness. The third case occurred in a soldier, aged 23, who had been injured by a shell fragment in the left temporal region, accompanied by temporary loss of consciousness and aphasia. Several days

8. Redlich, E.: Year Book of Psychiatry **37**: 68, 1917.
9. Haenel: Ein Fall von Narkolepsie, Zentralbl. f. d. ges. Neurol. u. Psychiat. **51**: 861, 1928.
10. Daniels, L. E.: Post-Traumatic Narcolepsy, Proc. Staff Meet., Mayo Clin. **7**: 489 (Aug. 24) 1932.
11. Thiele, Rudolf, and Bernhardt, Hermann: Beitrage zur Kenntnis der Narkolepsie, Abhandlungen aus der Neurologie, Psychiatrie, Psychologie und ihren Grenzgebieten, Berlin, S. Karger **69**: 1, 1933.
12. Lhermitte, J.: La forme narcoleptique tardive de la commotione cérébrale, Paris méd. **8**: 509 (Dec. 28) 1918.

V 106
1936

later his physicians were amazed by the numerous attacks of sleep that the patient had during the daytime, while his nocturnal sleep was normal. In the fourth case reported by the same author, a soldier, aged 26, was struck on the left frontal region by a piece of shrapnel. Immediately following this he had dreams of war terror, while during the day he would be overcome by attacks of profound sleep. He would fall asleep while walking, talking or eating. As this group indicates, no cataplectic attacks were observed in any of these cases.

Souques[13] reports a case following trauma with commotio cerebri in a young soldier in which the seizures of pathologic somnolence were typical. In this case there was marked pleocytosis in the spinal fluid. In the second case reported by Souques a cannoneer, aged 26, was stunned by shell-burst and hurled into the air, striking his head. He was unconscious for two days and showed a right hemiparesis, accompanied by aphasia. Three or four days following the accident pathologic attacks of diurnal sleep appeared, at first several times daily and finally changing to one attack daily. These attacks would last for about five or six minutes on an average. Spinal puncture at that time showed an increased pressure of the fluid and the presence of about 40 cells. Eight months later another lumbar puncture was made and the spinal fluid Wassermann reaction was found to be positive, whereas on all the previous occasions it had been negative. There was no change in his attacks of somnolence under antisyphilitic therapy.

Papastratigakis[14] reports the case of a man, aged 25, whose head had been caught between two carts while he was working in a quarry. He lost consciousness for several hours. Mental confusion lasted three or four months. During this state of mental confusion he would have periods of so-called narcoleptic attacks. A parkinsonian mask, cogwheel rigidity, and a rhythmic tremor finally developed. We include this case because of the typical Parkinson state as the result of trauma.

Pollock[15] reported the case of a young married woman who was rendered unconscious in an automobile accident. Three hours following the injury she returned to consciousness and complained of a severe headache and insomnia. A bloody spinal fluid was obtained on a lumbar puncture. Two weeks later, polyuria of 7 or 8 liters a day developed. At about the same time irresistible attacks of sleep commenced, and she would fall asleep standing or even talking. She would sleep for as long as ten minutes at a time but awakened quite refreshed. She had no cataplectic attacks.

Kahler[16] reports a case of pathologic sleep following a history of head injury. The time elapsing between the injury and the onset of the diurnal attacks of abnormal sleep covered a period of several years. Consequently we are not inclined to regard his case as of post-traumatic origin.

The majority of the cases reported in this paper are typified by the close relation between the time of the head trauma and the onset of pathologic and paroxysmal attacks of diurnal sleep.

The investigation of cases of post-traumatic narcolepsy renews interest in the etiology of the so-called idiopathic types of narcolepsy, for in the cases considered, the exciting cause is rather obvious and one can speculate with some degree of certainty on the changes in the brain. At the same time one cannot ignore the rôle that epidemic encephalitis or some other inflammatory disease of the hypothalamic region plays as a cause of narcolepsy, as it is an obvious fact, which must not be overlooked, that narcolepsy with cataplexy is rarely the sequel of head injury, which is a rather common accident. While our contribution to the subject of narcolepsy has not shed any light on its pathogenesis, we offer no apology because we have been unable to find any necropsy records from which we can quote. It is not within the scope of this paper to discuss theories. Those who may feel inclined to study the pathogenesis of narcolepsy further may consult the research studies of Pavlov,[17] the studies of Kleitman[18] on the subject of sleep, with expression of his own views, the contribution of Levin[19] on the pathogenesis of narcolepsy, and the work of Ranson.[20]

8 South Michigan Avenue.

13. Souques, A.: Narcolepsie d'origine traumatique, Rev. neurol. **32**: 321, 1918; Narcolepsie symptomatique et narcolepsie idiopathique, ibid. **1**: 846 (June) 1927.
14. Papastratigakis: Narcolepsie postcommotionelle tardive, Encéphale **23**: 354 (May) 1927.
15. Pollock, L. J.: M. Clin. North America **12**: 1111 (March) 1930.
16. Kahler, H.: Yearbook for Psychiatry **141**: 1, 1921.
17. Pavlov, I. P.: Lectures on Conditioned Reflexes, New York, Interpreter Publishing Company, 1928.
18. Kleitman, N.: Sleep, Physiol. Rev. **9**: 624 (Oct.) 1929.
19. Levin, M.: J. Neurol. & Psychiat. **14**: 1, 1933.
20. Ranson, S. W.: The Hypothalamus: Its Significance for Visceral Innervation and Emotional Expression, Tr. Coll. of Phys. of Philadelphia, series 4, vol. 11, no. 3, December 1934.

ABSTRACT OF DISCUSSION

DR. HENRY W. WOLTMAN, Rochester, Minn.: For the patient himself narcolepsy is dreadfully serious; even the symptoms of epilepsy can hardly cause greater distress or greater incapacity. Some difficulty is encountered in trying to establish criteria by which an injury may be adjudged the cause of narcoleptic and cataplectic seizures. The authors have stressed the time relationship. Other authors emphasize loss of consciousness and gross injury to the brain. The time relationship, however, may carry convincing significance. Two years ago a boy, aged 6 years, fell some 20 feet into a gravel pit. He was not rendered unconscious and could walk home unassisted. On arrival, he was frightened and extremely pale and soon fell asleep. From that day on his parents and teachers were deeply concerned over his attacks of drowsiness. Once he fell off a chair while asleep, and again he walked three blocks while asleep. The suggestion that narcolepsy and cataplexy originate in parts of the cortex may meet objection, but in the following case the aura may be compatible with it: A man, aged 38, said that sixteen years before a 20 foot fall rendered him unconscious for five hours. Shortly thereafter narcolepsy appeared. He complained of attacks of numbness, which began in the left palate and spread rapidly to the left ear, the eye and the nose. Then he would fall asleep. He also observed that when he was extremely interested, as in watching a prize fight, the aura did not precede the dormitial attack. Recently I observed a patient in whom gain in weight and dreams so vivid as to cause him to leave his bed and search for a friend whose voice he thought he had heard were much more impressive than a newly acquired facility in taking a nap. I suspect that as in epilepsy there may exist an incomplete or partial narcolepsy. The striking arrest of narcoleptic and cataplectic attacks by ephedrine was demonstrated convincingly by Doyle and Daniels. Marked improvement may also follow encephalography. Recently Love called my attention to another possible remedy. Following cervicodorsal sympathectomy and ganglionectomy for another purpose, a coexisting narcolepsy disappeared almost completely. I believe that the study of narcolepsy eventually will throw light on some little understood phenomena.

DR. JOHN B. DOYLE, Los Angeles: It has been demonstrated that in five of the thirteen cases previously reported and in the authors' case, attacks of cataplectic nature as well as of irresistible sleep were present. This should dispose of the belief that the syndrome flourishes in its fulness only in the idiopathic or cryptogenic cases. Like Thiele and Bernhardt, I feel that the close resemblance of the cryptogenic, postencephalitic and post-traumatic cases forces the conclusion that all the

cases rest on some pathophysiologic variation probably in the hypothalamus. It should be remembered, however, that the post-traumatic cases may also manifest any of the variegated symptoms and signs encountered in patients who have had injuries to the head. There has been considerable difference of opinion among authors as to whether a diagnosis of narcolepsy is justified by the presence of attacks of irresistible sleep in the absence of cataplexy. If the attacks of pathologic sleep are well defined and especially if other common symptoms manifested by narcoleptic patients can be elicited, the diagnosis may safely be made. As long as sixteen years has elapsed from the onset of spells of irresistible sleep until the development of cataplectic seizures. Daniels and I have shown that the course of narcolepsy is exceedingly chronic and persistent. Since amelioration of the symptoms has followed lumbar puncture and encephalography in isolated instances, more consideration should be given to the discriminate use of these procedures as therapeutic measures. Until curative or more satisfactory symptomatic therapy is evolved, it is on ephedrine sulfate that most sufferers from narcolepsy must rely.

DR. GEORGE W. HALL, Chicago: It seems to me that, as Dr. Doyle has said, ephedrine is not only a therapeutic agent but to a great extent a diagnostic agent. I have tried ephedrine on different kinds of sleep without success; on the other hand, at times I have given ephedrine when I have felt more sure of the presence of pathologic sleep, with results, even though there were no attacks of cataplexy present. Of course it is also true that the patients may go along with somnolence for a great period of time, only later to have cataplectic attacks. Still, I feel that sometimes one is dealing with cataplectic attacks without somnolent attacks, and if one is not careful one will make a diagnosis of petit mal in those cases rather than of cataplexy.

ELECTROCARDIOGRAPHIC STUDIES DURING SURGICAL ANESTHESIA

CHESTER M. KURTZ, M.D.
JAMES H. BENNETT, M.D.
AND
HERMAN H. SHAPIRO, M.D.
MADISON, WIS.

Anesthetists have long recognized that cardiac arrhythmias were commonly encountered during surgical operations and this has led to the more extensive study of cardiac disturbances by graphic methods. A number of investigators have approached the problem from both experimental and clinical standpoints and have recorded electrocardiograms before, during and after operations under various anesthetics. The results indicate that arrhythmias, conduction disturbances and other electrocardiographic changes are of very common occurrence. Some workers have considered the results only as related to the depth and type of anesthesia, while others have endeavored to determine the effect of the operative procedure. In the present study an attempt was made to evaluate as far as possible the various factors concerned and to separate the effects due primarily to the anesthetic, and those due to operative manipulations.

CASES STUDIED

One hundred and nine patients were studied during one hundred and thirteen surgical operations, two of the patients undergoing two separate operations and one patient three operations. All the patients were from the wards of the Wisconsin General Hospital and varied in age from 16 to 73 years. Seventy-four patients, or 69 per cent, had no demonstrable cardiovascular lesions, while the remaining thirty-five patients, or 31 per cent, exhibited cardiac abnormalities, definite arteriosclerosis or hypertension. The following anesthetic agents were employed: cyclopropane in forty-one cases, ether in twenty, procaine in thirteen, ethylene in eleven, nitrous oxide in ten, vinyl ether in seven, chloroform in six, and tribrom-ethanol in five. With the exception of vinyl ether, this is about the proportion in which these various anesthetic drugs were regularly being employed by the anesthesia service.

The operations included all the more common surgical procedures and were divided as follows: eighteen thyroidectomies, thirty-three abdominal operations consisting mainly of appendectomies, cholecystectomies and gastro-intestinal operations, twenty-six gynecologic procedures, nineteen herniorrhaphies, and sixteen miscellaneous operations, including a three-stage resection of a diverticulum of the esophagus. Cyclopropane was the anesthetic of choice in many of the poorer risks, and consequently the majority of the patients with hypertension or heart lesions are contained in the cyclopropane group. Twenty-three of the forty-one patients operated on under this agent had some form of cardiovascular disease, while the remaining nineteen were apparently normal in this respect.

PROCEDURE

In every instance a bedside electrocardiogram was taken the night before operation. In the majority of cases a hypodermic injection of morphine sulfate and scopolamine was given from one and one-half to two hours before operation and a second electrocardiogram was taken following the preoperative medication and immediately before the administration of the anesthetic, leads 1, 2 and 3 being taken as a routine for the first two electrocardiograms. From this point only lead 2 was recorded, tracings being taken during the period of induction and at intervals of from one to five minutes throughout the operation. An amplifying type of electrocardiograph was employed and the beam was under constant observation throughout the entire procedure. At the end of the operation a record including all three leads was taken as a routine when the anesthetic was discontinued and the patient was "coming out." Leads 1, 2 and 3 were taken the evening of the operative day, usually about ten hours following operation. In a few instances follow-up records were taken at varying intervals during convalescence. From twenty-five to forty-five electrocardiograms were taken during each operation, and in the longer procedures as many as sixty tracings were made. Each tracing was read individually, and the following data were recorded: (1) rhythm or arrhythmia, (2) rate, (3) axis deviation when all three leads were taken, (4) amplitude of QRS complexes in millimeters, (5) amplitude of T waves in millimeters, (6) position of ST segment with respect to the isoelectric line, and (7) the PR and QRS intervals in hundredths of a second. The simultaneous depth of anesthesia as noted by the anesthetist, the duration of anesthesia in minutes, and the exact step of the operative procedure were also recorded. The level of anesthesia was expressed in planes as described by Guedel.[1]

RESULTS

Types of Arrhythmia Encountered.—Figure 1 illustrates the various types of arrhythmia that were

Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the authors' reprints.

From the Departments of Anesthesia and Cardiology of the Wisconsin General Hospital, University of Wisconsin Medical School.

Read before the Section on Miscellaneous Topics, Session on Anesthesia, at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 12, 1935.

1. Guedel, A. E.: Stages of Anesthesia and a Reclassification of the Signs of Anesthesia, Anesth. & Analg. 6:157 (Aug.) 1927.

V 106
1936

encountered in the entire group and the number of cases in which each appeared. It was not at all uncommon for the same case to exhibit two or three different types of arrhythmias at one time or another. The cross-hatched bar indicates the total number of cases in which each arrhythmia occurred and the black bar indicates the number of those cases in which cardiovascular disease had been demonstrated. Partial heart

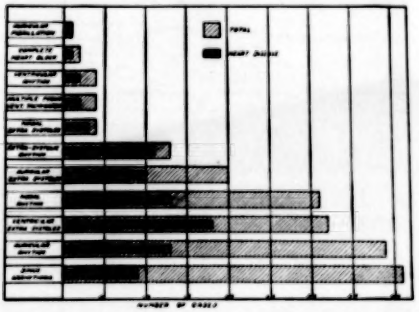


Fig. 1.—Incidence of various types of arrhythmias occurring in entire series. Cross-hatched bars indicate total number of cases in which each arrhythmia occurred. Solid black bars indicate number of patients with heart disease.

block manifested simply by a delay in the auriculoventricular conduction and not by actual dropped beats occurred in eight cases (not included in figure 1). Complete heart block occurred twice and in one case was accompanied by a partial sino-auricular block. In the latter, which occurred under ether, there was a marked bradycardia (idioventricular rhythm) with some periods of asystole of seven seconds or longer. Paroxysmal auricular fibrillation was found in only one case. This occurred during a cholecystectomy under vinyl ether along toward the end of the procedure, twice with the patient under light anesthesia and once when the anesthesia was deep enough to produce respiratory arrest. The gallbladder had been removed several minutes before fibrillation appeared. The most striking arrhythmia encountered was one characterized by a series of beats arising from multiple foci in the ventricles, totally irregular and at a rapid rate, from 130 to 180 per minute. For want of a better term this will be referred to as "multiple focus ventricular tachycardia" and is illustrated in figure 5 *C*.

In the four cases showing this type of disturbance the arrhythmia lasted from one to four minutes, after which the rhythm returned either abruptly or through stages of extrasystolic arrhythmia to normal. There was no remarkable change in the patient's general condition at the time.

It will be readily seen from figure 1 that three general types of arrhythmia predominated; namely, (1) extrasystoles of various origins, (2) displaced pacemaker, and (3) sinus arrhythmia. Figure 2 represents graphically the relative incidence of these three arrhythmias with respect to the anesthetic agent employed. Chloroform, vinyl ether and tribrom-ethanol in amylene hydrate were omitted from the graph owing to the fact that the series in these instances were not sufficiently large to make the percentages significant. The figures, however, will be found in table 1. The solid black bar indicates the percentage of the total number of cases under each anesthetic that exhibited any type of extrasystole during the period of anesthesia. Displacement of the pacemaker downward to the auricle, auriculoventricular node or ventricle is designated by the second bar in each case, while the third represents the incidence of sinus arrhythmia. The white bar indicates the percentage of cases in which no arrhythmia occurred during the procedure.

Extrasystoles showed a definite tendency to constitute the predominating form of arrhythmia in the patients with abnormal hearts, and this probably was a factor in the high percentage of the cyclopropane series exhibiting this type of disturbance, since more than half of these had demonstrable cardiovascular disease. In the other groups, which were predominantly composed of normal hearts, extrasystoles played a less prominent rôle. The ether cases showed an unusually high incidence of downward displacement of the pacemaker, and in only 20 per cent were extrasystoles found. Curiously enough, these arose in every case from the auricle or auriculoventricular node and not in a single instance from the ventricle. Displacement of the pacemaker was a prominent feature also of nitrous oxide and cyclopropane but was rarely present under procaine. The preoperative condition of the heart was apparently not a factor in this disturbance, as it occurred with equal frequency in both the normal and the abnormal hearts. Sinus arrhythmia appeared with considerable frequency under all anesthesias, particularly ethylene and nitrous oxide, but showed a definite predilection for the normal as compared with the abnormal hearts.

With the exception of procaine, the proportion of cases in which no arrhythmia occurred was below 30 per cent for each anesthetic. Two of the seven patients anesthetized with vinyl ether and one of the five patients under tribrom-ethanol remained free from

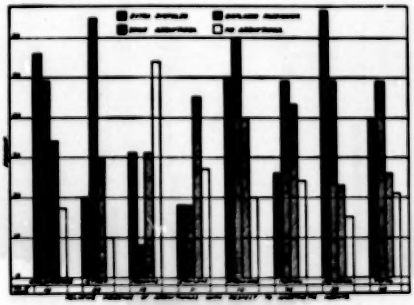


Fig. 2.—Percentage incidence of extrasystoles, displaced pacemaker and sinus arrhythmia with respect to various anesthetic agents and presence or absence of heart disease.

arrhythmias throughout. All six cases in which chloroform was used showed some type of disturbance. Only 10 per cent of the ether and 18 per cent of the cyclopropane cases escaped. The procaine group was conspicuous for its freedom from irregularities, with 54 per cent showing no gross changes. In comparing the normal and abnormal hearts, the former fared somewhat better, although the difference was not great. Of the entire series, only about one fifth maintained nor-

mal rhythm throughout. Mention should be made of the fact that the ethylene and nitrous oxide groups comprised the less extensive surgical procedures.

Relation of Arrhythmias to Type of Operation.—An attempt was made to relate the percentage incidence of the predominant types of arrhythmia to the field of operation, and figure 3 represents graphically the results of such a classification. In the thyroidectomy group extrasystoles and sinus arrhythmia were prominent, while displacement of the pacemaker was relatively uncommon. In every other type of operation, however, displacement of the pacemaker occurred very much more frequently, holding first place except in the case of the pelvic operations, in which extrasystoles exceeded slightly. The herniotomy group contained the highest percentage of cases which remained free from all disturbances of rhythm, while the pelvic operations stood at the other end of the list in this respect.

Relation of Arrhythmias to Steps in Operative Procedure, Depth and Duration of Anesthesia.—Disturbances of rhythm were observed at all stages of the operations and were frequently noted before the incision and during preparation of the operative field. Certain procedures were perhaps somewhat more commonly associated with irregularities, notably opening and closing of the peritoneum, traction on the gallbladder or uterus, exploration of the abdominal cavity by palpation, removal of the appendix, and excision of the thyroid gland. The depth of anesthesia did not appear to be an important factor as irregularities commonly occurred during the period of induction and all degrees of anesthesia. Most of the operations were conducted under first or second plane surgical anesthesia (light or medium), and increasing the depth even to the level of respiratory arrest failed to produce any greater disturbances than were noted in the upper planes. This was done on fifteen different occasions for a period of a minute or two, and under these conditions irregularities occurred no more frequently than

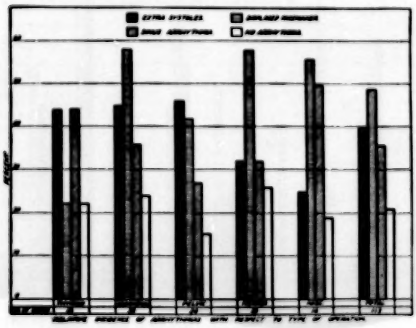


Fig. 3.—Percentage incidence of extrasystoles, displaced pacemaker and sinus arrhythmia with respect to type of operation.

at other times. The period of recovery immediately following the discontinuing of the anesthetic was remarkably free from irregularities, which was in sharp contrast to the relative frequency with which they appeared during the period of induction.

The duration of anesthesia was noted in every instance in which disturbances of rhythm occurred, and no constant relationship was found. Arrhythmias were perhaps slightly more common near the beginning of the operation but frequently occurred in the middle and later stages, sometimes lasting but a minute or two only to reappear after an interval. In the more marked extrasystolic arrhythmias there was a tendency for the changes to appear in a fairly uniform order. First occasional ventricular extrasystoles occurred at intervals of from five to ten beats, after which a period of

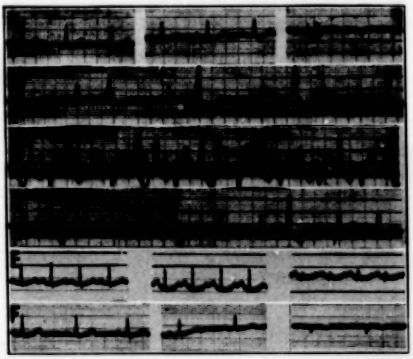


Fig. 5 (case 2).—A woman, aged 32, with a normal heart, had a pelvic operation under cyclopropane. There was ventricular extrasystolic rhythm at ten minutes during the preparation of the operative field, first plane anesthesia and multiple focus ventricular tachycardia at thirty-six minutes while the abdomen was being explored, first plane anesthesia. Rhythm returned to normal before the end of the operation after passing through transition stage shown in *D* at forty-three minutes. *A*, before operation (leads I, II and III); *B*, in first plane of anesthesia at ten minutes during preparation of field (lead II); *C* and *D*, first plane, thirty-six and forty-three minutes, respectively, exploration of abdomen (lead II); *E*, ten hours after operation (leads I, II and III); *F*, five weeks after operation (leads I, II and III).

extrasystolic rhythm [2] was frequently noted. This stage was followed by runs of multiple extrasystoles usually from different foci, which in the more extreme cases led to a multiple focus ventricular tachycardia or at times to an idioventricular rhythm confined to one focus and at a fairly normal rate. The return to normal rhythm was sometimes abrupt but more often went through the same changes just described, only in the reverse order.

QRS Complexes.—Excluding the ectopic beats, the only change noted in the QRS complexes in any given case was a variation in amplitude. This was an almost constant finding and was absent in only three cases. The net change in amplitude varied from 1 mm. to 8 mm., with an average of 2.2 mm. in the patients with normal hearts and 2.5 mm. in the series in which heart disease was present.

ST Segment.—A demonstrable shift in the level of the ST segment at some time during the procedure was noted in 70 per cent of all the cases. This occurred with the greatest frequency under ether and cyclopropane and was least marked with procaine, nitrous oxide and ethylene. These changes were usually transient and disappeared by the end of the operation.

T Waves.—The T wave in lead 2 underwent changes in amplitude in every case and frequently varied slightly from minute to minute. In eight cases the T wave became reversed in direction but with two exceptions

2. The term "extrasystolic rhythm" is here used to designate the regular recurrence of an extrasystole after each normal beat in contradistinction to the more common "extrasystolic arrhythmia," in which the ectopic beats occur quite irregularly.

V 106
1936

returned to its original status during the period of recovery. The maximum variation in amplitude in any given case was 4 mm., and the average for the entire series was 1.6 mm. A few cases showed only 0.5 mm. variation. No constant relationship could be demonstrated between the T wave changes and any of the conditions of anesthesia or operation.

PR Interval.—In only four cases in the entire series did the PR interval remain constant. The remaining 109 cases showed more or less fluctuation in the auriculoventricular conduction, with a maximum net change of 0.13 second occurring in two separate cases. The average net change was slightly over 0.03 second in the normal group and slightly under 0.04 second in those cases presenting abnormal hearts, or an average was almost invariably decreased from 1 to 4 mm. The T wave had a tendency to be increased in amplitude, although it remained unchanged in about one third of the cases. In about one half of the cases the ST segment became slightly depressed from its original level.

Comparison of Preoperative and Postoperative Electrocardiograms.—Since practically every electrocardiogram in the entire series showed one or more changes during the course of the operation, the question arose as to the promptness with which these changes disappeared. The electrocardiogram taken the night after operation (about ten hours postoperatively) was compared with the two control tracings taken before operation and the results of these observations are contained in table 2. In only five instances (4 per cent) could the

TABLE 1.—*Incidence of Arrhythmias Under Vinyl Ether, Chloroform and Tribrom-Ethanol in Amylene Hydrate* *

	Vinyl Ether						Chloroform						Tribrom-Ethanol in Amylene Hydrate					
	Normal		Abnormal		Total		Normal		Abnormal		Total		Normal		Abnormal		Total	
Type of Arrhythmia	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Sinus arrhythmia	1	20	2	100	3	42	3	60	0	0	3	50	2	40	0	0	2	40
Extrasystoles	2	40	1	50	3	42	2	40	1	100	3	50	1	20	0	0	1	20
Displaced pacemaker	3	60	2	100	5	72	4	80	1	100	5	83	3	60	0	0	3	60
No arrhythmia	2	20	0	0	2	28	0	0	0	0	0	0	1	20	0	0	1	20
Number of cases	5		2		7		5		1		6		5		0		5	

* Percentage is based on number of cases at foot of each column. Percentages in any one column may total more than 100, as more than one type of arrhythmia frequently appeared in the same case.

TABLE 2.—*Number of Cases Under Each Anesthetic in Which the Electrocardiogram Taken Ten Hours After Operation Was Found to Be Identical with, Similar to, or Definitely Different from Either of the Control Tracings Taken Before Operation* *

	Identical				Similar				Different			
			Total				Total				Total	
Anesthetic Agent	Normal	Abnormal	Number	Per Cent	Normal	Abnormal	Number	Per Cent	Normal	Abnormal	Number	Per Cent
Cyclopropane	2	1	3	7	13	15	28	68	5	5	10	25
Ether	0	0	0	0	9	7	16	84	2	1	3	16
Procaine	1	0	1	8	6	1	7	54	3	2	5	38
Ethylene	0	0	0	0	9	0	9	82	1	1	2	18
Nitrous oxide	0	1	1	10	5	1	6	60	3	0	3	30
Vinyl ether	0	0	0	0	5	1	6	86	0	1	1	14
Chloroform	0	0	0	0	5	1	6	100	0	0	0	0
Tribrom-ethanol in amylene hydrate	0	0	0	0	4	0	4	80	1	0	1	20
Total	3	2	5	4	56	26	82	74	15	10	25	22

* The percentages are based on the total number of patients operated on under each anesthetic.

of 0.034 second for the entire series. In general these changes bore no relation to the type or depth of anesthesia or to the operative procedure.

QRS Interval.—The intraventricular conduction as indicated by the QRS interval remained practically constant in the great majority of cases. In a very few instances there was a transient increase of from 0.01 to 0.02 second, but for the most part these changes were insignificant.

Effect of Preoperative Medication.—Approximately one and one-half hours before operation the patient received a hypodermic injection of one-eighth to one-fourth grain (8 to 16 mg.) of morphine sulfate and $\frac{1}{200}$ to $\frac{1}{100}$ grain (0.3 to 0.6 mg.) of scopolamine or more, depending entirely on the individual case. The electrocardiogram taken immediately before induction almost without exception showed certain changes as compared with the control electrocardiogram taken the night before. There was usually a definite change in rate, more often an increase than a decrease. The amplitude of the QRS complex as measured in lead 2 postoperative electrocardiogram be considered as practically identical with either of the first two tracings taken. In eighty-two cases (74 per cent) the postoperative electrocardiogram was similar to but not identical with either of the control records, while the remaining twenty-five (22 per cent) exhibited very definite differences with respect to one or more of the following: amplitude of the QRS complexes, direction and amplitude of the T waves, position of the ST segment, axis deviation, and rarely some form of arrhythmia.

Mortality.—Of the 109 patients only three have died, and these three all had advanced carcinomas, two of them dying on the twelfth postoperative day and the third on the fourteenth. In none of these three cases could the anesthesia or the operation be blamed for the fatal outcome.

COMMENT

The results of these observations agree in certain respects with those of other investigators who have made comparable studies. Krumbhaar,[3] Lennox,

3. Krumbhaar, E. B.: Electrocardiographic Observations in Toxic Goiter, Am. J. M. Sc. 155: 175 (Feb.) 1918.

Graves and Levine [4] and Hill [5] found very much the same type of arrhythmias as noted in the present series. Frommel,[6] working with the guinea-pig under ether anesthesia, found coupled rhythm due to ventricular extrasystoles. Heard and Strauss [7] reported one case of nodal rhythm occurring under ether anesthesia but stated that "no other cases of nodal rhythm have been observed by us in a series of twenty-one cases in which electrocardiographic records have been taken during anesthesia." This results in a much lower incidence of this type of arrhythmia than found by other workers, including ourselves. Hill,[5] working with chloroform, ether, nitrous oxide, ethyl chloride and tribrom-ethanol in amylene hydrate found the greatest number of disturbances under chloroform, but his observations led to the conclusion that the arrhythmias were chiefly a feature of induction and tended to disappear as anesthesia was deepened. Others have felt that a rapid change in the level of anesthesia was the precipitating factor in the appearance of irregularities. Our observations would partly substantiate this view, since they were frequently seen during induction; but deepening the anesthesia failed to restore and preserve normal rhythm. Some of the most pronounced disturbances occurred in cases which had been kept at a uniform level of anesthesia throughout, and irregularities were just as apt to appear at twenty, thirty or forty minutes after the beginning of the operation as during induction. The period of induction in the present study was usually short, and the rapidity with which the patient was "put under" may explain the frequency of arrhythmias at this stage, as contrasted with the period of recovery, in which the changes take place more gradually.

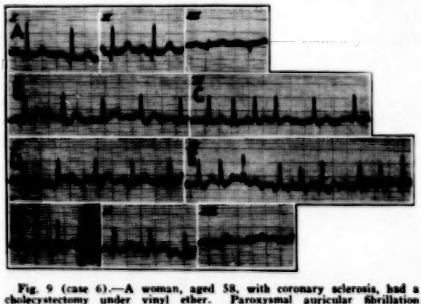


Fig. 9 (case 6).—A woman, aged 58, with coronary sclerosis, had a cholecystectomy under vinyl ether. Paroxysmal auricular fibrillation occurred well along in the operation following removal of the gallbladder under light anesthesia. This is the only case in the series showing this arrhythmia. Uneventful recovery. *A*, before operation; *B*, *C* and *D*, first plane, fifty-two, fifty-three and fifty-five minutes, respectively, shortly after removal of gallbladder; *E*, second plane, at sixty-five minutes, during closing of abdomen; *F*, at eighty-eight minutes, recovery.

Several attempts have been made to determine the responsibility of the surgical procedure for the appearance of arrhythmias. This presents considerable difficulty, as the anesthetic itself apears to be a potent factor in the production of cardiac disturbances. Wachsmuth and Eismeyer [8] recorded electrocardiograms during surgical procedures both in dogs and in human beings and concluded that operative manipulation was of much less importance than the anesthetic in the production of cardiac irregularities. Hill noted that "In some cases slowing of the heart followed traction of the carotid vessels or interference with the recurrent laryngeal nerves. But in general, operative manipulations (opening of the peritoneum, ligature of the cystic vessels and duct, dilatation of the anal sphincter, thyroidectomy) were without influence on the heart." Maher, Crittenden and Shapiro,[9] in a study of eighty-nine cases during major surgical procedures, were unable to determine any constant or specific relation between the surgical procedure and the cardiac response, although extrasystoles appeared in ten cases and bradycardia in seven cases in apparent direct association with visceral stimulation. Nodal rhythm, which occurred in thirty-four of their cases, was felt to be chiefly a function of deep anesthesia. In our studies, the changes were of a similar nature, and although disturbances were frequently noted during certain surgical procedures enumerated previously, arrhythmias at other times were so common as to minimize the possibility of any direct relationship.

One case, involving a three-stage resection of an esophageal diverticulum, was of particular interest from two standpoints. First, the operation necessitated dissection of the deep structures of the neck and a certain amount of trauma in the region of the nerves closely associated with the heart. The operative manipulations might have been expected to produce definite disturbances of one kind or another, but during the course of the first operation sinus arrhythmia was the only irregularity noted, and there were no disturbances of conduction. During the third operation, at which time the diverticulum was excised, the rhythm remained normal at a rate of from 70 to 90 throughout.

The second point of interest in this case was the fact that three separate anesthetic agents were employed. The first stage was done under cyclopropane, the second stage, which involved drainage of a collection of lymph in the wound, was performed under ether, and in the third stage only procaine infiltration was used. Under cyclopropane, extrasystoles and a wandering pacemaker occurred immediately following induction and before the operation was begun, but, as previously mentioned, sinus arrhythmia was the only irregularity noted during the surgical procedure. With the same patient under ether, an auricular or nodal pacemaker was present throughout. With procaine infiltration no disturbances of any kind appeared. In a comparison of these three anesthetics as used in the same patient, the most persistent arrhythmia occurred under ether, while only transient irregularities occurred with cyclopropane and none at all with procaine.

The occurrence of "multiple focus ventricular tachycardia" in approximately 10 per cent of the patients anesthetized with cyclopropane is a circumstance that deserves careful consideration. Levy,[10] working with cats, observed the same type of arrhythmia under chloroform anesthesia, and in a certain number of instances this was followed by ventricular fibrillation and death. He states: "Pending further light on this point it is

4. Lennox, W. G.; Graves, R. C., and Levine, S. A.: Electrocardiographic Study of Fifty Patients During Operation, Arch. Int. Med. **30**: 37 (July) 1922.

5. Hill, I. G. W.: The Human Heart in Anesthesia: Electrocardiographic Study, Edinburgh M. J. **29**: 533 (Sept.) 1932.

6. Frommel, E.: Arch. des mal. du coeur **20**: 705 (Nov.) 1927.

7. Heard, J. D., and Strauss, A. E.: A Report of the Electrocardiographic Studies of Two Cases of Nodal Rhythm Exhibiting RP Intervals, Am. J. M. Sc. **155**: 238 (Feb.) 1918.

8. Wachsmuth, W., and Eismeyer, G.: Heart Action As Affected by Operative Procedures, Deutsche Ztschr. f. Chir. **209**: 145, 1928.

9. Maher, C. G.; Crittenden, P. J., and Shapiro, P. F.: Electrocardiographic Studies of Viscerocardiac Reflexes During Major Operations, Am. Heart J. **9**: 664 (June) 1934.

10. Levy, A. G.: The Genesis of Ventricular Extrasystoles Under Chloroform, with Special Reference to Consecutive Ventricular Fibrillation, Heart **5**: 299, 1914.

V 106
1936

possible to make the important statement that in every single instance of ventricular fibrillation induced under chloroform by any of the methods I have employed, it has been preceded by a stage of complex ventricular irregularities, and that unquestionably the one condition leads to the other, whatever their relationship may be." Seevers, Meek, Rovenstine and Stiles,[11] in some experimental work with high concentrations of cyclopropane, made the observation that "two dogs died with ventricular fibrillation, occurring after short runs of ventricular extrasystoles and tachycardia." Hill,[5] in a clinical study, noted the same type of ventricular disturbance in seven cases under chloroform anesthesia and published an illustrative electrocardiogram which shows a ventricular mechanism identical with that recorded in our four cases. Ventricular fibrillation has been offered as the explanation for the cases of sudden death occasionally occurring during induction with chloroform, and, although definite proof in clinical cases is lacking, an arrhythmia which experimentally has been found to be a precursor of fatal ventricular fibrillation should be regarded, at least for the present, as having serious potentialities.

The problem that directly concerns the anesthetist is the means of detecting the presence of such an arrhythmia at the operating table. Checking back on the anesthetist's operating room record in the four cases in question, a total arrhythmia or "irregular irregularity" was noted in three of the patients at the time the electrocardiogram recorded the ventricular disturbance. The recorded pulse rate was from 30 to 100 points lower than the actual heart rate, probably owing to the fact that many of the beats did not propagate a pulse to the periphery. In the fourth case the disturbance was of short duration and was not picked up by the anesthetist. In general it may be stated that any total irregularity of the pulse as to both time and force, at an abnormally rapid rate, 100 or over, should excite suspicion, for it usually indicates one of two conditions, auricular fibrillation or multiple focus ventricular tachycardia, both of which are to be regarded as serious in a heart that has been beating regularly.

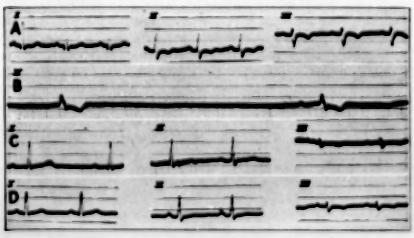


Fig. 11 (case 9).—A woman, aged 61, with coronary sclerosis, had a laparotomy under ether. Complete heart block and sino-auricular block with ventricular rate of 15 twenty-nine minutes after induction, during exposure of gallbladder, in second plane of anesthesia. Lasted five minutes and did not recur. Uneventful recovery. *A*, before operation; *B*, second plane, twenty-nine minutes, exposure of gallbladder; *C*, PR 0.25 second in first plane at seventy-one minutes, during closing of abdomen; *D*, ten hours after operation.

The fact that all four of the cases exhibiting this type of disturbance occurred under cyclopropane raises the question as to the risk that attends its employment as a routine anesthetic. In the first place, the present series of forty-one cases is too small to warrant any conclusions, and a larger series might greatly reduce the percentage incidence. In the second place, definite proof is lacking that ventricular fibrillation has ever been precipitated by this drug in man. The presence of other hydrocarbons as contaminants in commercial cyclopropane must be considered as a possible explanation of the relatively high incidence of apparently serious arrhythmias.

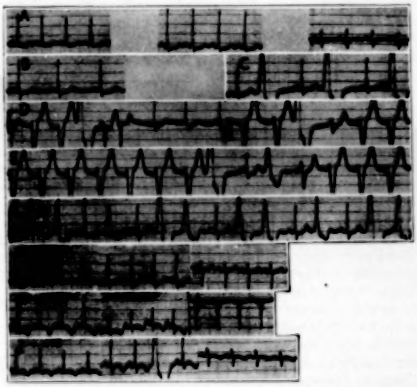


Fig. 13 (case 13).—A woman, aged 48, with hypertension, had a thyroidectomy under cyclopropane. Ventricular extrasystolic rhythm toward end of induction was followed a few minutes later by runs of ventricular extrasystoles, then a short period of ventricular rhythm at a rate of 100 before incision. Five minutes later, during dissection of thyroid, multiple ventricular extrasystoles recurred. First postoperative electrocardiogram shows sharp inversion of T_1 and T_2, which were upright before operation. Six days after operation T wave had not returned to upright position. The patient was bedridden when last heard from ten weeks after operation. *A*, before operation (leads I, II and III); *B*, induction at 2½ minutes (lead II); *C*, induction at four minutes (lead II); *D*, first plane, at nine minutes, before incision (lead II); *E*, same as *D*; *F*, first plane, fourteen minutes, dissection of thyroid, rate 110 (lead II); *G*, recovery at fifty minutes (leads I, II and III); *H*, ten hours after operation (leads I, II and III); note inverted T_1 and T_2; *I*, six days after operation (leads I, II and III); T_1 and T_2 still inverted.

The value of cyclopropane, for the present, will have to be judged by its properties as an anesthetic and the associated incidence of postoperative complications as compared with other agents. From this point of view the evidence is entirely in favor of cyclopropane, and it is felt by those most familiar with it that its use is accompanied by fewer unfavorable postoperative reactions and that in general it is a safer anesthetic, even in poor surgical risks, than most other drugs in general use at present.

The physiology or mechanism of the cardiac disturbances seen during surgical anesthesia is an interesting question. There is general agreement that stimulation of the vagus nerve is an important factor not only in inhibiting the normal pacemaker and forcing lower centers to assume this function but also in slowing the rate and permitting or encouraging escape mechanisms and extrasystoles. There must, however, be another factor which stimulates and increases the irritability of the myocardium to account for the rapid and irregular action originating below the sino-auricular node in a fair percentage of cases. The direct action of the anesthetic drug itself may be the explanation, but further investigation will be necessary to settle this question.

Another important phase that demands special study is the question of the significance of the changes noted

11. Seevers, M. H.; Meek, W. J.; Rovenstine, E. A., and Stiles, J. A.: Study of Cyclopropane Anesthesia, with Special Reference to Gas Concentrations, Respiratory and Electrocardiographic Changes, J. Pharmacol. & Exper. Therap. **51**:1 (May) 1934.

in the QRS complexes, ST segments and T waves of the electrocardiogram. Do these indicate myocardial damage? Are they permanent or transient and, if transient, how long do they remain? The profound changes shown by the electrocardiogram in the great majority of cases under surgical anesthesia leave no doubt that the heart is directly affected; but the nature, extent and permanence of the changes remain undetermined. It is hoped that further light may be thrown on this phase of the subject in the near future.

SUMMARY

Electrocardiographic studies were made on 109 patients during 113 surgical operations under various anesthetic agents as follows: cyclopropane forty-one, ether twenty, procaine thirteen, ethylene eleven, nitrous oxide ten, vinyl ether seven, chloroform six and tribrom-ethanol in amylene hydrate five. Electrocardiograms were taken as a routine before operation, at frequent intervals during the surgical procedure, during recovery, and ten hours after the operation.

Disturbances of rhythm constituted the most striking changes noted, sinus arrhythmia, extrasystoles and downward displacement of the pacemaker predominating. A rapid and totally irregular ventricular action, apparently never recorded except under anesthesia, occurred in four cases. Complete heart block was found twice and paroxysmal auricular fibrillation once. Arrhythmias appeared more frequently in abnormal than in normal hearts. The lowest incidence of arrhythmias occurred with procaine and the highest with chloroform. Of the entire series, only 21 per cent failed to show some type of disturbance. No constant and specific relationship could be established between the occurrence of arrhythmias and the depth of anesthesia or the steps in the surgical procedure.

Variations in the amplitude of the QRS complexes and T waves, shifting of the ST segment and changes in the PR interval occurred in the majority of cases and for the most part were of a transient nature.

In a large percentage of cases the electrocardiogram taken ten hours after operation differed in certain respects from the control tracings, and further work will be required to determine the persistence and significance of these changes.

ABSTRACT OF DISCUSSION

DR. E. A. ROVENSTINE, New York: Although this contribution is greatly appreciated, it adds to our already complicated problems. The authors have pointed out the possibility of the frequent interference with circulation in the majority of anesthesias, and the dangers inherent to the drug that is used. These dangers have long since been proved with certain anesthetics, but other agents have generally escaped this stigma. What concerns the anesthetist particularly is a means of detecting arrhythmias without an electrocardiograph in the operating room, and what to do in the presence of one. The pulse rate cannot suffice for diagnosis, because a great many beats will not propagate a peripheral pulse. The pulse rate is affected by hemorrhage and want of oxygen which may be present. While using cyclopropane, it has been felt that any irregularity of the pulse as to time or force with a rate of 100 or more is a sign of danger and suggests auricular fibrillation or ventricular tachycardia. It is also felt that any sudden change in the rate, unless it is in the presence of want of oxygen or hemorrhage, is an indication of impending danger. I should like to know whether there are any other means of detecting impending danger. The electrocardiographic observations with cyclopropane certainly render a further study of this drug necessary. There is no definite indication or no definite instance of ventricular fibrillation in man, but serious arrhythmias do occur. In their original experiments on animals, Henderson and Lucas found irregularities of the heart beat in their blood pressure tracings, and one of the earliest clinical observations at Wisconsin was the presence of arrhythmias. This observation of their presence led to an electrocardiographic study on dogs. It was concluded that cardiac arrhythmias occurred with high concentrations of cyclopropane and, further, that the agent was sufficiently toxic to produce cardiac paralysis, even in the presence of artificial respiration and adequate alveolar oxygen tension. Before condemning cyclopropane, one must consider its purity and stability. The drug is manufactured from trimethylene bromide reduced by metallic zinc. If the reduction is incompiete or the process faulty, trimethylene bromide or a halogen may become a contaminant with effects similar to those of other halogens. The present popular method of separating cyclopropane from propylene by shaking over a permanganate has been criticized, and no entirely satisfactory method of determining one in the presence of the other has been reported.

DR. LEWIS M. HURXTHAL, Boston: It seems to me that the question is not whether irregularities occur or what causes them particularly, but whether the patient gets through the operation, whether the irregularities disappear and whether there is any noticeable after-effect as the result of their appearance in conduction, in pacemaker and in rhythm. The important question is how the anesthetic is given and not the minor changes that may occur during anesthesia. From 95 to 99 per cent of all these patients do get through their anesthesia and are all right afterward as far as their heart is concerned. Too much attention should not be focused on electrocardiographic changes, but attention must be focused on the patient to show whether he is in shock, has difficulty in breathing or gives any evidence of the heart failing, as the result of anesthesia. The manipulation of the abdominal organs, to me, is of interest because it confirms or partly agrees with the clinical observation that irregularities of the heart are often associated with pathologic changes of the upper part of the abdomen. All these irregularities, as the authors point out, can come from anoxemia or vagus disturbances, and it was interesting to me, particularly, to note that there were just as many present with cyclopropane, when there was a large concentration of oxygen, as were present with the other anesthetics. Was there any correlation between the appearance of cardiac irregularities and the drop or the level of blood pressure?

DR. MILTON J. RAISBECK, New York: I have been very much interested in seeing these electrocardiograms, because they have the advantage of giving direct insight into what is going on in the cardiac muscle. There is one fact that cannot be escaped. Any one who has had experience with animal experimentation knows that when he has produced ventricular tachycardia he is just on the verge of producing ventricular fibrillation. Records of ventricular fibrillation are not obtained in man because the patient dies before the making of such a record is possible. The only chance to secure such records is in the experimental animal in which a toxic drug is being pushed up to the point of death. Even though ventricular fibrillation has not been demonstrated in man because electrodes cannot be placed quickly enough so that the record can be made, this is not a reason for assuming that the mammalian heart, in spite of differences from one animal species to another, does not show fairly constant behavior along certain lines. This means that cyclopropane may involve dangers that must be faced, at least in cardiac cases if not in others, in concentrations that apparently are necessary or are used in the current practice of anesthesia. In discussing the preceding paper, I said that I did not know much about cyclopropane. I feel that I know a little more now and my impression is that ethylene may have certain points in its favor until cyclopropane can get out from under the suspicions aroused by this study. I believe that this contribution adds an element of great precision to clinical observations. One may have one's opinions about what is going on, but with electrocardiograms one knows exactly what is taking place in the cardiac muscle as far as mechanism is concerned, and that certainly is important.

V 106
1936

DR. CHESTER M. KURTZ, Madison, Wis.: I am grateful for the helpful discussions. The question has come up whether any epinephrine was used in the procaine when given intraspinally or when used for regional block. Each hundred cc. of the procaine solution contained 1 cc. of 1:2,600 epinephrine. No relationship between blood pressure and electrocardiographic changes was demonstrated. This, of course, is necessarily a preliminary study, and it has opened up several avenues for further investigation. A number of questions have arisen needing clarification and considerable work will have to be done before the exact significance of the observations are understood.

NERVOUS COMPLICATIONS FOLLOWING SPINAL ANESTHESIA

A CLINICAL STUDY OF SEVEN CASES, WITH TISSUE STUDY IN ONE INSTANCE

SAMUEL BROCK, M.D.
AARON BELL, M.D.
AND
CHARLES DAVISON, M.D.
NEW YORK

The subarachnoid injection of cocaine derivatives for surgical analgesia has become an accepted and frequent procedure except in cases of severe myocardial degeneration, hypertension or psychoneurosis. The spinal anesthetic is easily administered; it eliminates the restlessness and excitement of the preanesthetic stage of ether, and it produces a greater degree of muscular relaxation. Moreover, spinal anesthesia has been repeated within short periods of time in the same individual without ill effects. Thus, Sullivan [1] records an instance in which five spinal anesthetics were given within thirty-eight hours.

A priori one might hesitate to bathe the spinal cord and roots in a fluid that has been demonstrated experimentally to have toxic effects on neural tissue. In 1908 Spielmeyer [2] injected stovaine (amylocaine hydrochloride B. P.) into the subarachnoid spaces of dogs and apes and later found degeneration of the roots and the peripheral portion of the cord and retrograde changes in the anterior horn cells. Recently Davis and his co-workers [4] showed that the spinal anesthetics in common use were both hemolytic and myelolytic; furthermore, when injected into dogs the spinal anesthetics produced an aseptic meningeal reaction with an exudation of plasma cells and proliferation of arachnoidal cells, which later resulted in a thickening of the meninges. There was also disintegration of the axons and degeneration of the peripheral portion of the cord. Lindemulder [7] described similar degenerative changes in the spinal cord and nerve roots in patients dying soon after the administration of spinal anesthetics.

The work of van Lier [8] and Wossidlo [9] is of prime importance. Wossidlo injected amylocaine hydrochloride into the subarachnoid space of rabbits. The lumbar cords were examined from one to twenty-four hours later. There were chromatolysis and swelling of the cells; scarcely any normal cells were found in the anterior horns after two hours. Improvement was noticed after six hours and the cells were normal again after twenty-four. These experiments prove that cocaine derivatives have toxic effects on neural tissue. Fortunately, this is usually a rapidly reversible reaction and recovery from the anesthetic is quick and complete. However, under unknown conditions the toxic reaction may not regress; permanent damage to the nerve structures then ensues.

Neurologic disturbances following the use of spinal anesthesia have often been recorded. However, there is much difference of opinion as to their frequency. Foss and Schwalm [10] state that in 3,000 cases they have never seen "the slightest evidence of peripheral neuritis or sensory or motor disturbances." They quote Pemberton to the same effect. On the other hand, Lindemulder,[7] Hyslop,[11] Smith [12] and others have recorded definite instances of neural disease following the administration of a spinal anesthetic. Hyslop gives 0.5 per cent as the incidence of sequelae in the central nervous system. Jarman [13] gives 0.01 per cent as the frequency of "paralyses." Nervous complications of the most varied types follow the use of spinal anesthesia. Among isolated cranial nerve paralyses, unilateral or bilateral abducens palsy is the most frequent; trigeminal, facial, auditory and hypoglossal nerve involvement has also been recorded. Lesions of the cauda equina, myelitis, aseptic meningitis and meningoencephalitis have been described. Almost any part of the central nervous system and even the entire central nervous system may be affected. The complications may be permanent if not fatal. These facts point to the need of limiting the use of subarachnoid injection to those special cases in which general anesthesia is too dangerous.

In this paper we are reporting seven personally observed instances of neural complications following spinal anesthesia, with tissue changes in the spinal cord in one case:

CASE 1.—M. B., a man, aged 22, entered the hospital Jan. 14, 1932, for a bilateral herniotomy. Two cubic centimeters of a preparation of procaine with strychnine sulfate was injected between the fourth and fifth lumbar vertebrae. The course was febrile for the next twenty-one days: from 100 to 101 F. for the first four days; from 102 to 104 F. for the next two days, and from 100 to 102 F. for the following three days; the fever rose to 105 F. on the tenth day. For the next three days it hovered about 104 F., with a gradual return to normal by lysis on the twenty-first day after operation. The pulse ranged from 80 to 116 during this period. The blood pressure ranged from 124 systolic, 70 diastolic to 136/92.

There were no complaints other than malaise and anorexia. For the first ten days the nature of the illness was not clear. Typhoid was considered, but a Widal test was negative. On the eleventh postoperative day, rigidity of the neck, haziness of the optic disks and vomiting made their appearance and a diagnosis of meningitis was made. This was substantiated by the spinal fluid changes. There were no signs of a focal lesion in the central nervous system at any time. Improvement began about the sixteenth day, and by the twenty-second day the patient was

---

Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the authors' reprints.

From the Department of Neurology, New York University College of Medicine, and the Department of Neuropathology, Montefiore Hospital.

Read before the Section on Nervous and Mental Diseases at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 14, 1935.

1. Sullivan, W. M., Jr.: Observations on a Patient to Whom Spinal Anesthesia Was Administered Five Times Within Thirty-Eight Hours, J. A. M. A. **99**: 993 (Sept. 17) 1932.
2. Spielmeyer, W.: Veränderungen des Nervensystems nach Stovain-Anästhesie, München. med. Wchnschr. **55**: 1629, 1908.
4. Davis, Loyal; Haven, Hale; Givens, J. H., and Emmet, John: Effects of Spinal Anesthetics on the Spinal Cord and Its membranes, J. A. M. A. **97**: 1781 (Dec. 12) 1931.
7. Lindemulder, F. G.: Spinal Anesthesia, J. A. M. A. **99**: 210 (July 10) 1932.
8. van Lier, E. H.: Histologischer Beitrag zur Rückenmarksanästhesie, Beitr. z. klin. Chir. **54**: 413, 1907.
9. Wossidlo, E.: Experimentelle Untersuchungen über Veränderungen der zinnoberhaltigen Granula bei der Lumbalanästhesie, Arch. f. klin. Chir. **86**: 1017, 1908.
10. Foss, H. L., and Schwalm, L. J.: Relative Merits of Spinal and Ether Anesthesia, J. A. M. A. **101**: 1711 (Nov. 25) 1933.
11. Hyslop, G. H.: Spinal Anesthesia: Nervous System Sequelae, Surg., Gynec. & Obst. **57**: 799 (Dec.) 1933.
12. Smith, W. A.: Neurologic Hazards of Spinal Anesthesia, J. M. A. Georgia **22**: 297 (Aug.) 1933.
13. Jarman, R.: Recent Advances in Anesthetics, Brit. M. J. **1**: 796 (May 5) 1934.

definitely convalescent. He was discharged from the hospital on the forty-fifth day following operation. The spinal fluid showed a mononucleosis beginning with 560 cells.

In this case an acute benign lymphocytic meningitis with a high sugar content in the spinal fluid developed slowly but directly after the use of spinal anesthesia. At no time was the patient very ill; recovery was complete. The case bears a close resemblance to the type of acute benign lymphocytic meningitis recently described by Abramson.[14]

CASE 2.—B. T., a youth, aged 19, entered the hospital June 12, 1934, for an appendectomy. An acutely inflamed appendix was removed under spinal anesthesia; 10.5 cc. of a 1:500 solution of nupercaine (Jones solution) was injected between the second and third lumbar vertebrae.

Three hours after the operation the patient became comatose. The temperature was 104 F.; the pulse rate was increased and respirations were normal. There was rigidity of the neck, an overactive right knee jerk and a positive left Babinski toe sign. Twenty-four hours after the operation the temperature returned to normal and remained so for three days. During this interval the patient was restless and noisy; he slept intermittently under sedation but complained of excruciating headache, temporarily relieved by lumbar puncture. On the fourth postoperative day there was a sharp rise in temperature to 104 F.; the pulse was 82 and respiration rate 22. A neurologic examination showed a rigid neck, a bilateral Kernig sign, absence of the right knee jerk, ankle jerks and lower abdominal reflexes, and bilateral Babinski toe signs. On the fifth postoperative day the temperature returned to normal and continued so until his discharge from the hospital eleven days after the operation. One month after his discharge the results of a neurologic examination were negative. The spinal fluid showed a polynucleosis beginning with 3,200 cells.

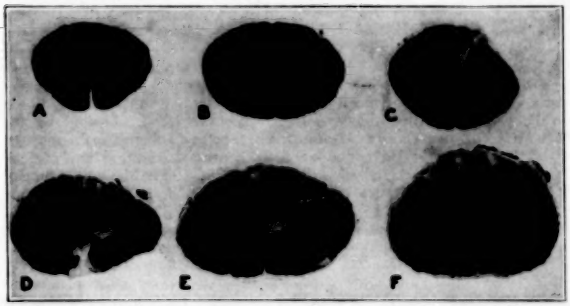


Fig. 1.—Transverse sections of the cord through the thoracic, lumbar and sacral segments, showing: *B*, demyelinization of most of the fiber tracts in the region of the ninth thoracic; *C*, twelfth thoracic; *D*, first lumbar; *E*, third lumbar, and *F*, first sacral. The demyelinization is most marked in the posterior columns and in the periphery of the cord. The seventh thoracic segment (*A*) simply shows an ascending degeneration. Myelin sheath stain.

In this case a severe meningitis characterized by polynucleosis and disappearance of sugar from the spinal fluid speedily followed spinal anesthesia. Recovery was rapid and complete.

CASE 3.—R. C., a housewife, aged 44, was operated on Sept. 20, 1932, under spinal anesthesia; 2.4 cc. of a preparation of procaine with strychnine sulfate was injected between the second and third lumbar vertebrae. A hysterectomy, appendectomy and bilateral salpingo-oophorectomy were done.

On the third day after operation severe headaches made their appearance, which persisted until the fourteenth postoperative day, when she was discharged from the hospital. On the eighteenth day after operation, following an automobile ride, the headache became agonizing; she vomited, and generalized weakness and occasional urinary and fecal incontinence developed. On the twenty-third day she reentered the hospital, acutely ill. She was dull and restless; the neck was stiff and a bilateral Kernig sign was found. The optic disks were hazy in outline. The deep reflexes were overactive, the left more so; bilateral Babinski toe signs were elicited. The blood pressure was 152 systolic, 108 diastolic. In the next forty-eight hours her lethargy deepened to coma. The right pupil was larger than the left, and both reacted sluggishly. Automatic movements of the upper and lower extremities were noted with a tendency to postural fixations of the extremities (catatonia). On the twenty-fifth postoperative day examination disclosed stupor, generalized weakness, incontinence, absence of corneal reflexes, right peripheral facial weakness, a diminution of the palatal reflexes, double Babinski toe signs, and absent abdominal reflexes. The blood pressure was 136 systolic, 100 diastolic. On the twenty-seventh day, left ptosis, weakness of the left external rectus muscle and inconstant skew deviation of the eyes were noted. On the thirtieth day improvement began. During her second stay in the hospital a febrile reaction of from 100 to 102 F. was noted from the twenty-fifth to the thirtieth postoperative day.

April 9, 1934, nineteen months later, her physician stated that she was much improved and was up and about doing her housework, and that the ocular muscle weakness was almost entirely gone but that her speech was a bit defective.

This case presented the clinical picture of a polioencephalitis of such severity that for a number of days the patient was regarded as dying. A slow improvement set in; nineteen months later she still had residual signs.

CASE 4.—B. B., a man, aged 56, underwent a first stage prostatectomy on Dec. 9, 1932. December 21, the second stage was performed. Both procedures were carried out under spinal anesthesia, 100 mg. of procaine hydrochloride being injected between the third and fourth lumbar vertebrae on both occasions. Three weeks later (Jan. 15, 1933) severe radiating pain appeared in both groins, the scrotum and the testicles. The pain was much increased by walking. February 8, paravertebral block was resorted to for relief. Quinine and urea hydrochloride was injected in the region of the first and second lumbar roots; the patient was relieved for seventy-two hours. February 12 the severe pain recurred.

We saw him for the first time on February 13, seven weeks after the second spinal anesthesia; at this time the pains in the groin were most marked, especially on the right. They were aggravated by movement of the lower extremities. Examination disclosed diminution of the ankle and knee jerks and equally active abdominal reflexes. There was no Babinski toe sign. The appreciation of pain and temperature was diminished in the area of supply of the anterior branches of the twelfth thoracic and first lumbar nerves on the left. The second lumbar and the first sacral spines were tender. Diathermy afforded no relief, and on March 1 paravertebral block was again tried, with injection of the first and second lumbar roots. On this occasion a mixture of 2 cc. of 5 per cent procaine hydrochloride and 2 cc. of 95 per cent alcohol was used. Relief followed for twenty-four hours. Then anesthesia appeared in the lower extremities and trunk as high as the umbilicus. This numbness receded in a few hours to the level of the second lumbar dermatome. The original inguinal pain persisted and about two weeks later a burning pain appeared in the lumbar region. At this time neurologic examination disclosed diminution of the right lower abdominal reflex, diminished knee and ankle jerks, and an area of lessened sensibility extending from the eighth thoracic to the second lumbar dermatomes. By May, five months later, atrophy of the left quadriceps muscle was evi-

14. Abramson, J. L.: Acute Lymphocytic Meningitis, Arch. Neurol. & Psychiat. 31:1235 (June) 1934.

V 106
1936

dent. The right knee jerk was diminished and the left absent; the ankle jerk on the right was fairly active, the left less so. The upper abdominal reflexes were present, the lower absent. Weakness of the lower abdominal muscles caused pouching of the lower part of the abdomen. He was last seen in April 1934, sixteen months later. He had made great improvement and was able to work. He still complained of very transient attacks of "pins and needles" and pain radiating from the knees to the groins, more marked on the left side. There was constant slight pain in the left groin. Some urgency and frequency of urination persisted; difficulty in defecation due apparently to weakness of the lower abdominal muscles was also present. The knee jerk was still diminished on the right and absent on the left. The ankle jerks were equal. The middle and lower abdominal reflexes were absent. A partial return of power was noted in the quadriceps muscle. However, he was unable to arise from the squatting position. Sensation was still defective from the twelfth thoracic to the second lumbar dermatomes.

Fig. 2.—Longitudinal section of the cord showing destruction and swelling of the myelin sheaths; myelin sheath stain; × 400.

This case presented a syndrome of radiculitis following spinal anesthesia. Unfortunately, the paravertebral injections accentuated the root pain and produced signs of mild cord involvement.

CASE 5.—I. L., a housewife, aged 34, entered the hospital June 18, 1934, and under spinal anesthesia a supravaginal hysterectomy, a right oophorectomy and a bilateral salpingectomy were performed. Eleven cubic centimeters of a 1:500 solution of nupercaine was injected between the second and third lumbar vertebrae.

On the seventh postoperative day she suddenly lapsed into coma. The blood sugar was 400 mg., the urine was strongly positive for sugar and acetone, and the carbon dioxide combining capacity of the blood was 26.7 volumes per cent. A preoperative examination of the urine and the history had been negative for diabetes mellitus. The latter, which appeared postoperatively, was readily controlled with insulin and diet, and the patient made an uneventful recovery. However, on the thirty-sixth postoperative day signs of severe, acute cholecystitis developed; operation was deemed necessary. There had been no neurologic complaints following the first spinal anesthesia. On the thirty-seventh day after the first operation, a cholecystectomy and drainage were done under spinal anesthesia. Again, the anesthesia used was 10 cc. of a 1:500 solution of nupercaine, which was injected between the first and second lumbar vertebrae. On the first postoperative day the patient complained of being unable to move both lower extremities. On the second postoperative day a decubitus ulcer appeared in the upper portion of the intergluteal cleft. Examination disclosed paralysis of the left lower extremity with foot drop, paresis of the right lower extremity, absent knee and ankle jerks, an equivocal right Babinski toe sign, and hypalgesia of the perianal region and of the left lower extremity, more pronounced in the lumbar segments. There was retention of urine and incontinence of feces. On the fourth postoperative day, examination showed a level at the sixth thoracic dermatome below which there was involvement of all types of sensation more on the left than on the right, with bilateral perianal analgesia and anesthesia, paraparesis with greater motor weakness on the left, absent knee and ankle jerks and an equivocal right Babinski toe sign. There was in addition an extensive sacral decubitus. On the ninth postoperative day, two areas of diminished sensation could be made out; one from the sixth thoracic dermatome to the third lumbar on the left and a second from the first sacral to the coccygeal dermatomes bilaterally. In other respects the examination was unchanged. Two months after the second operation, examination showed profound symmetrical wasting of the muscles of both lower extremities. The sensory changes persisted. Three months after the second operation there was some improvement in power. She could now raise the limbs off the bed, flex the knees and abduct and adduct the thighs. The movements were executed with great unsteadiness and coarse tremor. The sensory, reflex and sphincter disturbances were unchanged. From repeated catheterization, the patient developed a bilateral

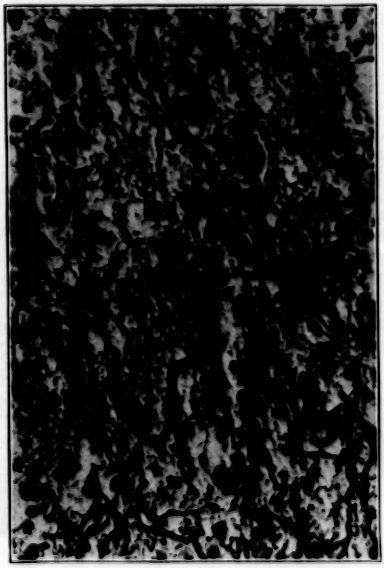


Fig. 3.—Longitudinal section of the cord showing destruction of axis cylinders; Bielschowsky method; × 400.

infected hydronephrosis and for two weeks had a septic temperature, ranging from 100 to 104 F., the rise being accompanied occasionally by a chill. The insertion of a permanent catheter and the administration of urinary antiseptics relieved this condition. Five months after the second operation she could walk about thirty paces with assistance.

This patient was given the same spinal anesthetic on two occasions. Following the first, no neurologic ill effects were noted. Twenty-four hours after the administration of the second spinal anesthetic signs of a severe cauda equina neuritis developed together with an apparently independent focus of myelopathy in the thoracic cord. She is slowly recovering.

The development of the diabetes mellitus needs special comment. It should be emphasized that a urinary examination and the history before the first

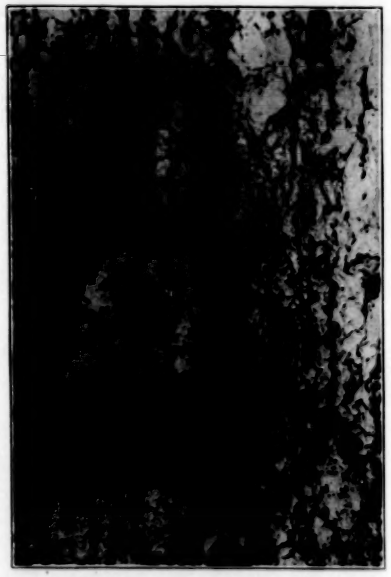


Fig. 4.—Longitudinal section of the cord showing poor gliosis; Holzer method; × 200.

operation were negative. The subsequent rapid appearance of the diabetes is difficult to explain. However, the absence of pain and weakness in the lower extremities and the presence of active knee jerks before the second operation as well as the type of acute radiculomyelopathy that developed after the second operation suffice to rule out diabetes as a causative factor in the neurologic condition that followed the second spinal anesthesia.

CASE 6.—A man, aged 54, was seen by a physician in March 1929 because of melena, tenesmus and diarrhea alternating with constipation. These symptoms continued until September 1930, when a bandlike pain in the right lumbar region appeared, the pain radiating anteriorly. October 27 an exploratory operation was undertaken. Spinal anesthesia was used. As soon as the drug was injected, he experienced severe pain radiating down the lower limbs. The pain was so intense that general anesthesia had to be employed. Adhesions were found between the omentum and the lower anterior abdominal wall, compressing a loop of small intestine; diverticulitis of the sigmoid was also discovered. Directly after recovery from the general anesthesia the severe pain in the lower extremities continued and weakness in the lower limbs appeared. On two or three occasions in November he had hematuria. We saw him in February 1931, four months after the operation, complaining of pain and weakness in the lower extremities, tenderness in the region of the anus, impaired sphincteric control, unsteadiness in gait, and loss of weight (42 pounds, or 19 Kg.). Examination at this time showed weakness of the right lower extremity, depressed knee jerks and very much diminished ankle jerks, and loss of the lower abdominal reflexes. There was a double Lasègue sign, and it was noted that coughing and sneezing caused pain in the lower limbs. There was a diminution of pain and temperature sensation up as far as the tenth thoracic dermatome. At that time spinal fluid examination showed no block and was normal except for the colloidal gold curve, which was 4432100000. A diagnosis of cauda equina neuritis was made. However, the loss of the lower abdominal reflexes and the level of sensory change to the tenth thoracic dermatome indicated slight cord involvement. He came under observation again in March 1933, twenty-nine months after operation. The pain had continued without remission and of late had increased. He could hardly walk. Incontinence of urine had become a prominent feature. The lower extremities were somewhat spastic. There was generalized muscular atrophy and weakness in the lower extremities, especially below the knees, with bilateral foot drop. The knee jerks were now overactive, the ankle jerks were absent, and equivocal bilateral Babinski toe signs were noted. All forms of sensation were diminished below the first lumbar dermatome. The lower extremities also showed a degree of overreaction to painful stimuli (hyperpathia). Vibration and position and joint sense were absent in the right lower extremity and diminished in the left. Evidence of spinal automatism and relaxation of the anal sphincter were also found. He was next seen in May 1933, thirty-one months after operation. In April 1933, paravertebral block had been undertaken for the relief of pain in the lower extremities; it was unsuccessful. In his attempt to relieve pain he had become addicted to the use of morphine. At this time the signs of transverse "myelitis" had progressed. Chordotomy was performed May 10, following which the pain disappeared. The surgeon, Dr. L. M. Davidoff, noted that the cord presented the appearance of intramedullary disease. Four days after the chordotomy, pneumonia developed from which he recovered. Later, infection of the genito-urinary tract set in. He died, July 25, thirty-three months after the original operation.

This patient presented a cauda equina "neuritis" with mild cord involvement. He was first seen four months after the administration of the spinal anesthetic. In the next twenty-nine months the clinical picture of a transverse "myelitis" and "radiculitis" developed, which ultimately proved fatal.

CASE 7.—M. G., a man, aged 47, entered the hospital Oct. 3, 1934, in a state of shock. He had been struck a hard blow in the abdomen by the rebounding handle of a freight elevator. The abdomen was distended and the anterior abdominal wall was rigid and exquisitely tender. The blood pressure was 170 systolic, 90 diastolic, the temperature 101.6 F., the pulse 96 and the respiration rate 26. A blood count showed 14,700 white blood cells, with 88 per cent polymorphonuclear leukocytes. An exploratory laparotomy was performed under spinal anesthesia. Ten cubic centimeters of a 1:500 solution of nupercaine was injected between the second and third lumbar vertebrae. No abdominal lesion was disclosed. Three days after the operation the patient complained of paralysis and numbness of both lower extremities. On the fifth postoperative day examination showed a flaccid paraplegia in flexion, loss of knee and ankle jerks, absent cremasteric reflexes, and a level at the twelfth thoracic dermatome below which the appreciation of pain, touch, temperature, vibration, and joint position sensations were lost. Between the tenth and twelfth thoracic dermatomes there were hyperalgesia and hyperesthesia. Retention of

V 106
1936

urine and feces was present. On the sixth postoperative day, bedsores appeared in the intergluteal cleft and over the left great trochanter. On the sixteenth postoperative day, fecal incontinence appeared; urinary retention persisted. In all other respects the picture of a severe transverse "myelitis" continued unchanged. From now on the patient had a septic temperature, ranging from 99.8 in the morning to 104 F. in the late afternoon. Occasionally, the rise in temperature was preceded by a severe chill. He now had a cystitis and pyelonephritis. The instillation of a permanent catheter and adequate drainage from the decubital sores did not influence the temperature curve. On two occasions blood culture revealed Staphylococcus aureus and albus. The patient lost ground rapidly and three months after the operation he died as a result of secondary sepsis.

At autopsy, gross examination of the bladder showed evidence of a marked cystitis; in addition, there were ureteritis, pyelitis and abscesses in both kidneys. The abdominal viscera were otherwise normal.

The spinal cord and roots were removed up to the third thoracic segment. The dura was intact. The pia-arachnoid was hyperemic, especially in the lumbar region. The cord was slightly hyperemic at the eighth thoracic segment and especially so at the tenth thoracic segment. The posterolateral columns at the eleventh segment were softened. At the twelfth thoracic and first lumbar segments the cord appeared softened, except for a small part of the anterior columns.

In the myelin sheath preparations the cord between the ninth thoracic and sacral segments showed the following: At the ninth thoracic segment there was demyelinization of most of the fiber tracts; this was most pronounced in the region of the lateral pyramidal, spinothalamic, rubrospinal and ventral spinocerebellar tracts (fig. 1 *B*). The demyelinization was more marked at the periphery; in the lateral pyramidal tracts it was of a patchy nature (fig. 1 *B*). The posterior columns at this level showed a slight ascending degeneration. At the twelfth thoracic segment the demyelinization was more marked in the posterior columns, posterior horns, anterior pyramidal and spinothalamic tracts (fig. 1 *C*). The entrance zones of the posterior roots showed more involvement at this level than in any other region (fig. 1 *C*). At the first lumbar segment the lesion was most marked in the anterior pyramidal tracts and posterior columns, the fasciculus gracilis being more involved than the fasciculus cuneatus (fig. 1 *D*). The other fiber tracts

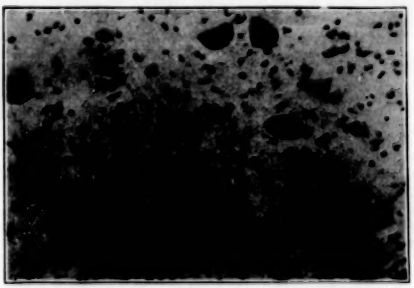


Fig. 5.—Chromatolysis and shadow cells of anterior horns; cresyl violet; slightly reduced from a photomicrograph with a magnification of 200 diameters.

at this level showed slight areas of demyelinization. In the lumbar enlargement there was demyelinization of the fasciculus gracilis and patchy areas of degeneration in the lateral pyramidal, dorsal and ventral spinocerebellar tracts (fig. 1 *E*). In the sacral region the most marked destruction was noticed in the posterior columns; the pyramidal tract showed a slight descending degeneration (fig. 1 *F*); the posterior roots were markedly demyelinated (fig. 1 *F*). The segments above the ninth thoracic region showed an ascending degeneration (fig. 1 *A*). Under higher magnification the area of demyelinization, especially at the periphery, had a honeycombed appearance. The myelin sheaths showed complete disintegration, swelling or fragmentation (fig. 2). In the fat preparations the entire cord between the ninth thoracic and the lower sacral segments was filled with fatty globules, which were most abundant at the periphery of the cord. The entrance zones of the posterior roots at the eleventh and twelfth thoracic and the first lumbar segments were completely filled with fat; fatty globules were also found in the perivascular spaces of

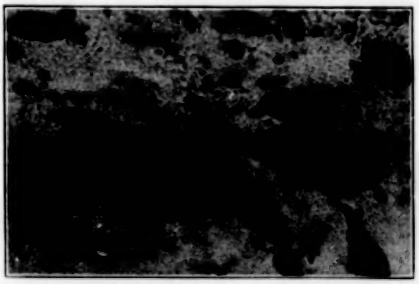


Fig. 6.—Ganglion cells from the lateral horns showing chromatolysis and peripherally displaced nuclei, giving the cells a "fish eye" appearance; cresyl violet; slightly reduced from a photomicrograph with a magnification of 400 diameters.

the gray matter. In the Bielschowsky stained sections, the affected axis cylinders presented various pathologic changes such as complete breaking down, swelling and corkscrew processes (fig. 3). The areas of destruction in the Holzer preparations disclosed a poor glial response and a honeycombed appearance (fig. 4). This glial response was similar to that seen in the cords of untreated cases of subacute combined degeneration (pernicious anemia). In the cresyl violet preparations, some of the ganglion cells in the involved segments, especially those in the ventrolateral group, showed chromatolysis, pigment atrophy and vacuolization (fig. 5). The lateral horn cells showed chromatolysis with peripheral displacement of the nuclei, giving the cells a "fish eye" appearance (fig. 6). In the sudan III preparations some of the ganglion cells contained fatty deposits.

In this patient a toxic myelopathy with the symptoms of spinal shock followed the use of a spinal anesthetic. The lesion was of unusual severity and resulted rapidly in a fatal issue. Neither operation nor autopsy threw any light on the nature of the posttraumatic abdominal condition that led to the exploratory laparotomy. The spinal anesthetic produced extensive destruction of the myelin sheath, axis cylinders and glia, mostly at the periphery of the cord and at the zones of entrance of the posterior roots (fig. 1). The ganglion cells of the anterior and lateral horns were also slightly involved. Similar ganglion cell changes have been found in other cases of toxic and experimental myelopathy induced by various spinal anesthetics. In their study of toxic myelopathy, Davison and Keschner [15] noted that the periphery of the cord was more involved than the central parts and that there was the same lack of glial response which is consistent with the short duration of the disease.

COMMENT

In all but one of these cases the cocaine derivative used was known; two received a preparation of procaine

15. Davison, Charles, and Keschner, Moses: Myelitis and Myelopathic Lesions; Toxic Myelopathy, Arch. Neurol. & Psychiat. 29: 600 (March) 1933.

with strychnine sulfate, three nupercaine and one procaine hydrochloride. The site of injection was the lumbar subarachnoid space between the second and third lumbar vertebrae or lower, except in one instance (case 5) in which the injection was made between the first and second lumbar vertebrae. This patient was subjected to two subarachnoid injections within thirty-eight days; patient 4 received two spinal anesthetics within twelve days. In both cases 4 and 5 the neurologic complications followed the second administration.

In this series there were two instances of aseptic meningitis, one of polioencephalitis, one of lumbar radiculitis, two of cauda equina neuritis and "myelitis," and one of transverse "myelitis." The time elapsing between the spinal anesthesia and the appearance of the neural complications varied. In the two cases of meningitis the onset was almost immediate, while at the other extreme is the case of lumbar radiculitis (case 4) with an interval of three weeks between the administration and the onset of the neural symptoms. In six of the seven cases the neurologic disturbances appeared within three days after the anesthesia.

Clinically, the two cases of aseptic meningitis ran a rapid and benign course ending in complete recovery. One instance of cauda equina neuritis and "myelitis" (case 6) and the other of transverse "myelitis" (case 7) ended fatally from complications directly attributable to the neural disease, twenty-nine months and three months after the onset, respectively. Case 6 was particularly interesting in that the clinical course was characterized by long periods during which the condition was stationary; these periods were followed by spread of the process to higher levels of the cord. The most pain occurred in the patient with the lumbar radiculitis (patient 4). He still showed slight residual signs sixteen months after the onset. One of the patients with cauda equina neuritis and "myelitis" (patient 5) regained the ability to take a few steps five months after the onset, but the sphincters and sensory and reflex status remained unchanged. In the instance of polioencephalitis (case 3), life was despaired of early in the illness, yet the patient recovered but still had residual signs nineteen months after the onset.

The spinal fluid showed no characteristic picture. In case 1 there was an exudation of lymphocytes, while in case 2 there was a pleocytosis of polymorphonuclear cells with disappearance of sugar. With the recovery of these two patients the spinal fluids returned to normal.

The question of etiology in this series needs discussion. In all of the cases but one (case 4) the neural syndromes so speedily followed the administration of the spinal anesthesia as to suggest immediately a direct chemotoxic effect of the cocaine derivatives on the neuraxis. It must be emphasized, however, that the direct chemotoxic effect does not entirely explain the causation of the neural complications. There is the undeniable fact that the great majority of patients operated on under spinal anesthesia do not develop complications of the central nervous system. Furthermore, instances like case 4, in which the interval between the anesthesia and the onset of symptoms is relatively long, and like case 6, in which cauda equina neuritis and mild cord involvement continued over a period of months, terminating in a fatal transverse "myelitis," suggest the possible intervention of other factors. What these may be is a matter of speculation at the present time. To account for the relative infrequency of neurologic complications following spinal anesthesia, one has to assume the existence of tissue sensitivity to the cocaine derivatives. Instances like cases 4 and 5, in which two spinal anesthetics were administered, the first without ill effect, the second followed by neural disease, suggest that the first anesthesia had sensitized the nervous tissue. This assumption would not account for case 6, in which a process immediately followed a subarachnoid anesthesia and spread insidiously to higher parts of the cord over a period of twenty-nine months. Chemical agents usually have acute effects which spend themselves; the patient then suffers from the fixed after-effects of the poisoning. This was not so in case 6. Here one is led to assume that an original chemotoxic effect permitted other factors (virus?) to operate on a neural tissue devitalized by the anesthetic.

A consideration of the difference in the cellular reactions of the spinal fluid in the two instances of meningitis adds weight to the belief that other factors participate. In this connection the very close resemblance of the case of lymphocytic meningitis to the cases described by Abramson is of special interest, since his review of the evidence concerning the etiology is very much in favor of a virus.

The tissue changes in the spinal cord in case 7 are those of a toxic myelopathy exactly similar to the few cases already mentioned in the literature.

Spinal anesthesia has been successfully used in so many diverse conditions that the associated surgical diseases can have no causative relationship to the nervous complications.

It should be noted that allergic factors are not involved in these cases, since one is not dealing with protein sensitization. Unfortunately, at the present time there is no way of determining whether or not a patient's nervous tissues are oversensitive to the cocaine group of anesthetics. Nor is there anything but an unsatisfactory symptomatic therapy available, once nervous complications arise. For these reasons it is strongly urged that spinal anesthesia be restricted to a special group of individuals unable to withstand the risks of a general anesthetic.

1192 Park Avenue.

V 106
1936

ABSTRACT OF DISCUSSION

Dr. E. D. Friedman, New York: I have no desire to discredit spinal anesthesia but feel that attention should be directed to some unfortunate sequelae. Few reports on the subject of spinal anesthesia give observations on the neurologic status following the induction of anesthesia, the neurologic complications or the postmortem observations. Many surgeons prefer this method of anesthesia because it produces greater muscular relaxation and thus makes it possible for them to operate more rapidly. It also lessens the difficulty of replacing the intestine within the abdominal cavity at the end of the operation. The incidence of postoperative pneumonia is not lessened by this method of anesthesia and it therefore offers no diminution of risk as compared with ether anesthesia. The method must then be evaluated on the basis of the untoward complications. The most common symptom after the subsidence of the temporary anesthesia is pain in the extremities, especially the lower limbs (probably due to radicular irritation). The fact that the posterior aspect and especially the periphery of the cord seem to be principally involved would indicate a direct toxic effect of either the drug itself or a split product. The hypothetical toxin that gives rise to posterolateral sclerosis seems to involve approximately the same portion of the cord; it is also a myelolytic agent. The fact, too, that in six of the seven cases reported the neurologic sequelae appeared within three days after the induction of the anesthesia would also seem to incriminate the drug or a derivative of it. The fact that when the meninges

alone are involved the prognosis is good, but that when the neural parenchyma is involved the prognosis is poor, is corroboration of experiences in other forms of neural disease. The late development of symptoms in cases 4 and 6 is not an unusual phenomenon in neurology, although the exact mechanism is not altogether clear. Late sequelae have been described in cases of trauma to the spine in which the neural lesions come on long afterward; this may be the result of secondary vascular changes in the cord. I have encountered bilateral external rectus palsy and a number of cases of paralysis of visceral outflow with the development of adynamic ileus and retention of urine. Since the factor of constitution plays a rôle in all illness, one might presuppose that in certain individuals constitutional predisposition or vulnerability to chemotoxic agents may play a rôle. This whole subject should be further investigated through the cooperation of surgeons and neurologists and the obtaining of accurate neurologic data in all cases in which this method of anesthesia has been employed.

DR. G. H. HYSLOP, New York: It is my impression that surgeons who frequently use spinal anesthesia have at last become aware of its risks and complications. While it is true that the case material presented by the authors justifies one in regarding spinal anesthesia with caution, there is no need for becoming an alarmist. The value of this contribution lies in the fact that the authors have carefully described a variety of sequelae that should be recognized. It would seem that such sequelae cannot be regarded as preventable. An accurate idea as to the frequency of the minor or major unavoidable sequelae of spinal anesthesia does not exist. From my own knowledge I am satisfied that some of the authors of statistical papers have been unaware of and therefore omitted reference to nervous system sequelae that have occurred. The etiology of these sequelae is not clear. The drugs used produce temporary changes in nerve tissue through some chemical affinity. The degree of such tissue reaction probably varies with the individual. It is academically possible that idiosyncrasy, when present, is solely responsible for some of the transient minor after-effects. Such cases as the one described by the authors, in which a progressive chronic disability occurs, must involve more than tissue idiosyncrasy to the drug used. It is not known whether a latent virus may become activated in such cases, but this possibility is worthy of consideration. I do not think that the nervous system complications are due to the introduction of a virus during the procedure. Other intraspinal procedures, including routine lumbar puncture, are not known to be followed by conditions that are really comparable with the nervous system sequelae of spinal anesthesia. Familiarity with the fact that sequelae may occur should not permit one to be careless and jump at the conclusion that in a given case the clinical picture can be accounted for only as a sequel to anesthesia. True virus infections produce similar clinical pictures and might occur in a given case purely by coincidence. The correlation between the type of sequelae and its incubation period may give information of value from the etiologic standpoint. Frequent examinations of the spinal fluid during the forty-eight hours after a spinal anesthesia, including a complete analysis of all the chemical constituents, may give important information. Routine analysis of the spinal fluid has not revealed anything unusual in a small number of cases.

DR. C. C. NASH, Dallas, Texas: What drug and what method of administration was used in the spinal anesthesia? I didn't understand whether the authors stated that the drug was mixed with spinal fluid or whether it was carried in a solution, as some proprietary preparations are.

DR. SAMUEL BROCK, New York: Before spinal anesthesia can be used as a routine procedure, some method must be found to eliminate individuals whose nervous tissues are unduly sensitive. As Drs. Friedman and Hyslop have mentioned, the cause of slowly progressive lesions is not clear. Might I point out that certain diseases, such as measles and vaccinia, are occasionally complicated by nervous involvement similar to that which has been described. In such cases there is much in favor of the current view that a latent virus is activated by the primary disease. It is possible that toxic lesions in some instances of spinal anesthesia may likewise permit a dormant virus to attack devitalized tissue. Concerning the type of drug used, may I say that these were standard preparations of nupercaine, of a preparation of procaine with strychnine sulfate, and of Jones solution, the dosage in all being the usual one. The drug was injected slowly, without admixture of spinal fluid. The same technic was used in hundreds of other cases in these hospitals without ill effect.

THE GILL BONE BLOCK OPERATION FOR FOOT DROP

THOMAS F. WHEELDON, M.D.
RICHMOND, VA.
AND
M. MELVIN CLARK, M.D.
ROCHESTER, N. Y.

Disabilities of the ankle joint incident to various types of paralyses are of such frequency as to be of real interest not only to the orthopedic surgeon but to the general practitioner as well. Paralyses associated with anterior poliomyelitis probably comprise the largest group, but foot drop is often associated with cerebral hemorrhage and traumatic injury of the common peroneal nerve and is found occasionally associated with fractures of the spine. The muscle imbalance and resulting incoordination, such as is found in congenital cerebral paralysis, is frequently responsible for functional foot drop. Paralysis of or comparative weakness

Fig. 1.—Model showing bone block in position beneath plate of bone and cartilage of the astragalus. Source of bone block in the os calcis is shown.

in the dorsal flexors of the foot allows the unbalanced plantar flexors, with gravity, to draw the foot into a foot drop position.

A brief review of the ankle joint mechanics will assist in understanding the value of the operative procedure under consideration. The ankle joint is essentially a hinged joint, made up of the concave lower end of the tibia, the convex upper surface of the astragalus or talus, with the respective malleoli of the tibia and fibula, which, with the transverse ligaments, form a mortise for the reception of the astragalus. Lateral motion is negligible. Very slight forward motion of

the tibia on the astragalus is possible. Dorsal flexion of the foot consists in the approximation of the dorsum of the foot to the front of the leg, a right angle position being used as a starting point. Motion normally exists in dorsal flexion to about 10 to 20 degrees beyond a right angle with the long axis of the leg, but this varies with the length and relaxation of the gastrocnemius and the position of the knee; that is, with the knee flexed the gastrocnemius is relaxed sufficiently to allow greater dorsal flexion than when the knee is extended. Plantar flexion generally exists to a degree that allows the foot to be moved to a point from 50 to 60 degrees beyond a right angle with the leg. According to Snow,[1]

The operative procedure that we have used is essentially that of Dr. Gill, with one or two minor modifications. The skin incision is usually made parallel to the achilles tendon at the medial side. The tendon is exposed and divided Z fashion. An incision is then made longitudinally through the underlying fat, which is then pushed to both sides, exposing the posterior aspect of the ankle joint and the superior surface of the os calcis. The ankle joint is opened. The foot is then dorsally flexed to the limit of motion. This brings the posterior portion of the articular surface of the astragalus into view in the wound. With a thin, broad osteotome, the articular surface with a thin portion of

Summary of Cases

Patient	Age, Years	Diagnosis and Previous Treatment	Immobilized	Time Observed	Result
R. L.	13	Anterior poliomyelitis, foot drop and triple arthrodesis (left)	8 weeks	2 years	Excellent; block holds well; foot stable; no pain
M. P. E.	9	Anterior poliomyelitis, foot drop, previous triple arthrodesis (left)	5 weeks	2 years	Excellent; block holds well; no pain
C. D.	10	Anterior poliomyelitis, foot drop, previous Hoke arthrodesis (right)	5 weeks	26 months	Partial failure; about 15 degrees plantar flexion allowed; reoperated; first block too small
W. W. C.	20	Chronic osteomyelitis, old compound fracture of fibular head, traumatic section of deep peroneal nerve, foot drop (left)	7 weeks	28 months	Excellent; block holds well; no pain
M. M. F.	8	Anterior poliomyelitis, foot dop (right).....	5 weeks	26 months	Excellent; block holds well; no pain
G. S.	13	Anterior poliomyelitis, foot drop (left).....	7 weeks	12 months	Excellent; block holds well; no pain
H. A. A.	..	Anterior poliomyelitis, foot drop (left).....	7 weeks	15 months	Excellent; block holds well; no pain
M. M. L.	23	Congenital dislocation of hips, foot drop after old manipulation of hips; operation combined with left subastragalar arthrodesis	7 weeks	18 months	Excellent; block holds well; no pain
T. R. B.	6	Anterior poliomyelitis, foot drop; previous Hoke operation combined with extensor proprius hallucis to first metatarsal	8 weeks	15 months	Excellent; block holds well; no pain
D. B.	18	Anterior poliomyelitis, foot drop; previous Hoke block combined with right calcaneo-cuboid arthrodesis	8 weeks	15 months	Excellent; block holds well; no pain
D. M.	14	Anterior poliomyelitis, foot drop; previous Hoke operation (right)	8 weeks	12 months	Excellent; block holds well; no pain
G. B.	21	Anterior poliomyelitis, foot drop (left).....	7 weeks	12 months	Excellent; block holds well; no pain
F. J.	15	Anterior poliomyelitis, foot drop; previous Hoke operation (right)	4 weeks	36 months	Excellent; block holds well; no pain
D. L. J.	14	Anterior poliomyelitis, flail foot and foot drop; operation combined with triple arthrodesis	6 weeks	34 months	Excellent; block holds well; foot stable; no pain
F. J.	15	Anterior poliomyelitis, foot drop previous Hoke operation (left)	6 weeks	29 months	Excellent; block holds well; foot stable; no pain
O. F.	15	Anterior poliomyelitis, foot drop (right).....	4 weeks	25 months	Excellent; block holds well; no pain
O. F.	15	Anterior poliomyelitis, foot drop (left).....	4 weeks	25 months	Excellent; block holds well; no pain
M. G.	15	Anterior poliomyelitis, foot drop; flail leg (left knee arthrodesed)	6 weeks	25 months	Excellent; block holds well; no pain
M. P.	8	Anterior poliomyelitis, foot drop (left); previous arthrodesis knee (left)	6 weeks	22 months	Excellent; block holds well; no pain
N. P. S.	16	Anterior poliomyelitis, foot drop (left); previous Hoke operation	4 weeks	38 months	Excellent; block holds well; no pain
V. A. R.	9	Anterior poliomyelitis, foot drop (left); previous Campbell block (18 months before fracture of graft)	6 weeks	25 months	Excellent; block holds well; no pain
W. L.	6	Anterior poliomyelitis, foot drop; block combined with subastragalar arthrodesis	7 weeks	25 months	Excellent; block holds well; no pain
L. M. G.	11	Anterior poliomyelitis, foot drop (right).....	6 weeks	24 months	Excellent; block holds well; no pain
G. S.	12	Anterior poliomyelitis, foot drop (right).....	4 weeks	12 months	Partial failure; 15 degrees plantar flexion allowed; reoperated successfully
M. F. B.	13	Anterior poliomyelitis, foot drop; previous Hoke operation (left)	6 weeks	28 months	Excellent; block holds well; no pain

the extreme limit of plantar flexion is reached when impingement occurs between the posterior groove of the astragalus and the margin of the tibia. The Gill bone block operation [2] to limit foot drop utilizes this mechanical fact. We have employed the operation, as first described by Dr. A. Bruce Gill, for the past three years with increasing satisfaction.

The indications for the operative procedure that we have demanded are essentially those as described by Dr. Gill in two types of cases: first, in the type of flail or dangle foot, and second, in the type of case in which a strong achilles tendon is not balanced by anterior muscles.

bone of the astragalus is lifted upward from behind until it comes in contact with the posterior lip of the tibia. The angle of the wedgelike space thus formed lies well forward beneath the cartilage and in front of the posterior lip of the tibia. This procedure must be carefully done to avoid breaking the anterior aspect of the plate of cartilage and bone. A wedge shaped piece of bone (fig. 1) is then removed from the upper aspect of the os calcis, having plane surfaces to correspond to the surfaces of the space formed in the astragalus, and is driven firmly into the space beneath the superior portion of the astragalus. The achilles tendon is sutured with the necessary amount of lengthening. We have preferred closing the wound with plain No. 1 catgut, with either plain 00 catgut or black silk sutures for the skin. The operation has always been performed with the aid of a tourniquet. The foot is immobilized in

1. Snow, L. C.: Mechanical and Anatomical Principles of Operation for Drop Foot: Suggested New Operations, Surg., Gynec. & Obst. **51**: 252 (Aug.) 1930.

2. Gill, A. B.: Operation to Make Posterior Bone Block at Ankle, to Limit Foot Drop, J. Bone & Joint Surg. **15**: 166 (Jan.) 1933.

V 106 1936

plaster extending from the toes to the knee, with the foot in slight dorsal flexion, for approximately six weeks. Many of the patients have been bearing weight on their plaster casts at the end of six weeks and were free of plaster at the end of eight weeks. Other types of operative procedures [3] have been advocated and used to correct foot drop with varying degrees of success. Some of the operations have involved the use of a bone graft on the superior surface of the os calcis, which impinges with the posterior inferior surface of the tibia. These operations are popular and are apparently successful. However, several fractures of the new bone pillars have been reported and there is a very definite possibility of some pressure atrophy on the bone graft. In our hands, the Gill bone block has been more uniformly satisfactory.

In the past three years we have performed twenty-five operations of the Gill bone block in twenty-three different patients, with excellent results in twenty-three of the operations, two patients having been operated on twice. In these twenty-three excellent results, the block has been uniformly effective; there has been freedom from pain and in some cases the patient has noted a return of power to a greater or less degree of the previously overstretched dorsal flexors. In two of the earlier cases in this series the block obtained was not completely effective, about 15 degrees of plantar flexion being allowed. These partial failures we feel have been due entirely to the fact that an insufficient width of bony block was used at the time of the operation and can in no wise be interpreted as a fault in the operative procedure as outlined by Dr. Gill. We feel that this method offers certain very definite advantages over other procedures; namely, its simplicity, the ease and speed with which it can be done, the shortness of time necessary to immobilize the foot, and, in addition, the removal of any danger of possible fracture of a bone graft such as is obtained by some of the operative methods.

Fig. 2.—Roentgen appearance of foot in typical drop position. Same case as in figure 3.

Of the twenty-three excellent results, eight cases have been observed over a period of from one to one and a half years, fourteen from two to two and a half years and three for more than three years. The two partial failures demonstrated a partial ineffectual block about three months after operation. In none of the cases has there been any tendency to the development of a calcaneus deformity.

SUMMARY AND CONCLUSIONS

With the operation as described by Dr. A. Bruce Gill to make a posterior bone block at the ankle to limit foot drop twenty-three excellent results in twenty-five operative cases have been obtained, with effective bone blocks and freedom from pain. Two partial failures have been due to errors in technic and not to the operative procedure itself. In none of the cases has there been any tendency to the development of calcaneus deformity. The operative procedure can be done rapidly and easily, and it is seldom necessary to immobilize the foot longer than eight weeks.

Fig. 3.—Typical postoperative appearance of foot.

Fig. 4.—Typical postoperative roentgen appearance of foot. *A* and *B* correspond to *A* and *B* in figure 1.

318 West Franklin Street.

3. Campbell, W. C.: Operation for the Correction of Drop-Foot, J. Bone & Joint Surg. **5**:815 (Oct.) 1923; End Results of Operation for Correction of Drop-Foot, J. A. M. A. **85**:1927 (Dec. 19) 1925. Nové-Josserand, G.: "Artrorise" of the Foot, J. Bone & Joint Surg. **10**:261 (April) 1928. Mayer, L.: Operative Treatment of Paralytic Deformities of Foot, Am. J. Surg. **7**:80 (July) 1929. Wagner, L. C.: Modified Bone Block (Campbell) of Ankle from Paralytic Drop Foot, with Report of Twenty-Seven Cases, J. Bone & Joint Surg. **13**:142 (Jan.) 1931. Camparglis, A.: Correction of Drop Foot by Posterior Arthrodesis, ibid. **13**:54 (Jan.) 1931.

TORULOSIS

LOUIS A. MITCHELL, M.D.
NEWARK, OHIO

Stoddard and Cutler[1] in 1916 were the first to describe accurately the clinical and pathologic characteristics of torula infection in man. It is probable that cases of torulosis had been observed previous to that time, but the distinction between this infection and systemic blastomycosis, as well as coccidioidal granulomas, had not been clearly defined. Following the work of these observers the disease received more general recognition and cases were reported from practically all parts of the world. In 1931 Freeman[2] published a comprehensive monograph on the subject and at that time was able to collect forty-three cases of torula infection from the literature. At present it is impossible to make a correct estimate of its incidence, because of the frequency with which unreported cases are encountered. However, the medical profession generally is not familiar with the characteristics of this infection and the appearance of a case is of sufficient interest to deserve mention.

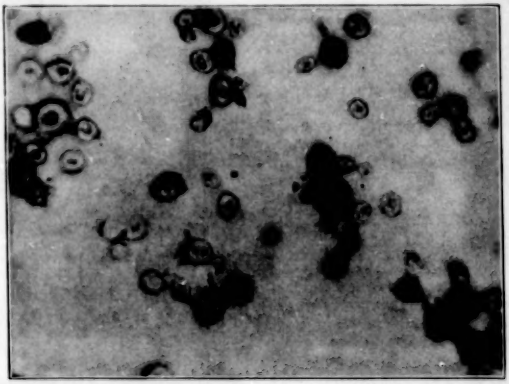
REPORT OF CASE

History.—C. W., a man, aged 53, Chinese, was studied in association with Dr. J. R. McClure in the medical service of the Newark City Hospital in March 1935. He was born in San Francisco and had made two trips to the Orient. He contracted no acute illnesses during these trips, and they had no apparent effect on his general health. For the past eighteen years the general state of the patient's health had not been good, but he had been able to follow his occupation as a laundryman with but few interruptions. During this period he suffered from a kidney disorder, which was characterized by transient attacks of chyluria and hematuria. On several occasions a filaria organism was found to account for the etiology of this condition and the attacks cleared up promptly under arsphenamine treatment. He was frequently admitted to hospitals, where he underwent thorough diagnostic study. He was discharged from such an institution one month before the onset of the present illness, and up to this time nothing suggestive of torulosis had been discovered.

The present illness began about two weeks before admission with a severe frontal headache accompanied by weakness and dizziness. These symptoms developed rapidly. He was so unsteady on his feet that he could not walk or even stand without support. The headache remained localized in the frontal region but became so severe as to be almost intolerable. During the past few days he had been nauseated and vomited frequently, the vomiting being quite forceful.

Physical Examination.—The patient was of small stature and of delicate skeletal structure. He was normally developed but poorly nourished. The skin was dry and wrinkled and the subcutaneous tissues were wasted, showing evidence of marked recent loss of weight. There was a fairly abundant thatch of coarse black hair on the head. The body hair was normal in amount and distribution. The mental state was stuporous and the patient was restless and moaned frequently. He could be aroused and responded intelligently to simple questions. At times he seemed excitable and apprehensive and mumbled in his native tongue. Even in moderate light there was marked photophobia. The neck muscles were spastic and the neck could not be flexed beyond a 180 degree angle with the trunk. Kernig's sign was questionably positive. The patellar reflexes were absent. Babinski's sign was negative. The strength of the muscles of the trunk and extremities was greatly reduced but bilaterally equal. The sense of pain was apparently normal and there was no evidence of abnormality of the sensorium, although a detailed examination was impossible, owing to the cloudy mental state of the patient.

The eyeballs were normally and equally prominent. There was marked nystagmus when the eyes were turned in either lateral position. The sclerae were clear and the conjunctivae were pale. The pupils were small, round and equal and reacted only slightly to light. There was no evident impairment of sight. The nostrils were free from obstruction and discharge. The patient responded only to a loud voice, but the lack of response was apparently due to stupor. The ear canals were free from discharge and the tympanic membranes were retracted and of a dull gray. There was the scar of a healed perforation in the right ear. The mastoid regions were free from swelling or unusual tenderness. There was a good complement of teeth, in fairly good repair. The tongue protruded in the midline and its surface was covered by a thin white coat.



Appearance under high power of torula cells recovered directly from spinal fluid. Note the absence of leukocytes. The diagnosis of torulosis depends on the demonstration of these organisms. The organisms have the same appearance after prolonged cultivation on culture mediums; no endospores or mycelia are formed.

The lymph nodes showed no unusual adenopathy. The thyroid gland was small and of uniform, fibrous consistency. The radial, brachial and temporal arteries were smooth, straight and compressible. The heart rate was 68 per minute and regular. There was no enlargement of the precordial area of dulness. The sounds were of good quality and normally accentuated. The first sound at the apex was accompanied by a soft systolic murmur, not transmitted. The anterior abdominal wall was retracted. The liver and spleen were not enlarged to palpation or percussion. There was no unusual tenderness. There was no deformity or limitation of motion of any of the joints of the extremities.

Laboratory Examinations.—Except for a trace of albumin and an occasional hyaline and granular cast, examination of the urine gave essentially negative results.

Blood count showed a marked degree of secondary anemia and a definite disturbance of the differential leukocyte count. Hemoglobin was 50 per cent, the red cell count 4,300,000, and total leukocytes numbered 7,000. Differential polymorphonuclears, 95 per cent; lymphocytes, 3 per cent; large mononuclears, 2 per cent. The red blood cells stained poorly and with pale centers. There was definite anisocytosis and poikilocytosis.

A cloudy spinal fluid was under such high tension that it escaped from the needle in a continuous stream. After 30 cc. of fluid had been removed the pressure was reduced to normal and the patient was more quiet and apparently more comfortable. The analysis of the fluid was as follows: sugar,

1. Stoddard, J. L., and Cutler, E. C.: Torula Infection in Man, monograph 6, Rockefeller Institute of Medical Research, Jan. 13, 1916.
2. Freeman, Walter: Torula Infection of the Central Nervous System, J. f. Psychol. u. Neurol. 42:304 (Nov.) 1931.

V 106
1936

absent; globulin, very faint trace; cell count, negative. Microscopic examination with a wet preparation showed heavy walled round bodies with buds. Gram stain showed gram-positive budding, yeastlike bodies, and no cells. An india ink preparation showed the majority of the organism to be surrounded by a wide capsule, the width of the capsule being equal to or exceeding the diameter of the cell proper. The average diameter, including the capsule, was approximately 21 microns.

The centrifugated spinal fluid was inoculated on the following mediums: plain agar, 1 per cent dextrose agar, blood agar and Sabouraud's agar. The plates showed no growth after twenty-four hours. Good growth appeared on all plates in forty-eight hours. Sabouraud's mediums incubated at room temperature showed somewhat better growth than did any of the others. Cultures incubated under partial anaerobic conditions for ten days showed no mycelia or endospores.

Dextrose, lactose, maltose, saccharose and xylose were inoculated. None of these showed fermentation at the end of ten days.

Progress of Disease While Under Observation.—A transfusion of 500 cc. of citrated blood was given. This produced only slight elevation of hemoglobin percentage and red blood cell count and resulted in no improvement in the general condition of the patient. From the time of admission until the patient died five days later the mental state was one of gradually increasing coma with active delirium. He was inclined to be excitable and talked in his native tongue, apparently in a rambling fashion. On the several occasions when he got out of bed he exhibited a marked incoordination of all bodily movements, so that he could not stand or even sit up without firm support. The physical and neurologic examinations showed no essential change from the condition described on admission. The temperature followed a low febrile course and did not exceed 100 F. until a brief terminal rise occurred. The pulse rate varied between 60 and 90. Attacks of forceful vomiting were frequent. The immediate cause of death appeared to be the toxemia incident to the infection of the central nervous system. Postmortem examination was refused.

BIOLOGIC AND CULTURAL CHARACTERISTICS OF TORULA

Torulae are distinguished from the higher yeasts in that they form neither endospores nor mycelia and from the saccharomycetes by their pathogenicity and by the fact that they do not characteristically ferment sugars.

Torula grows readily on all laboratory mediums but the maximum is obtained on Sabouraud's medium. It grows best at room temperature, although a good growth occurs also at 37 C. In forty-eight hours a soft mucilaginous growth is formed on solid mediums, which, as it piles up, has a tendency to flow toward the dependent portion of the tube. The cultures are resistant, so that the organisms can be recultivated from cultures that have apparently been completely dried up for several months.

Torula cells are gram positive. The cells have a more or less definite nucleus, and there is a fine reticular structure of the cytoplasm. In india ink preparations a capsule may be demonstrated as a clear, broad luminous area surrounding the cells.

There is a wide variation in the pathogenicity of Torula to experimentally inoculated laboratory animals. The rabbit is practically immune, while rats and mice are probably the most susceptible animals. Guinea-pigs also are easily infected and the organism readily invades their central nervous system. Torula may produce disease spontaneously in the lower animals. Infection of the horse was first described by Frothingham;[3] Weidman and Ratcliffe[4] observed the disease in the horse as well as in the captive chetah (hunting leopard).

3. Frothingham, Langdon: J. Exper. Med. **8**: 31, 1902.
4. Weidman, F. D., and Ratcliffe, H. L.: Extensive Generalized Torulosis in a Chetah or Hunting Leopard, Arch. Path. **18**: 362 (Sept.) 1934.

CLINICAL MANIFESTATIONS OF TORULA

The portal of entry to the body is probably the respiratory tract, but the evidence at hand is not conclusive. The open pharynx has been most often suspected, and the possibility of the organism entering the body through the tonsils, the accessory nasal sinuses and the middle ear has been mentioned. The central nervous system may be invaded without evidence of infection elsewhere in the body. The organism has been thought by some observers to invade the body by way of the gastro-intestinal tract. Large lymphatic tumors are often produced by invasion of the lymph nodes, and it is probable that the lymphatic system offers the most active defense against a generalized spread of the infection.

The onset of the disease may be insidious, with a marked delay in the appearance of symptoms. A generalized visceral involvement is relatively rare and was observed only three times in Freeman's [2] series of forty-three cases. When it does occur the clinical symptoms change with the variation in location and extent of the lesions, which may involve the liver, spleen, bone marrow, lymph nodes, kidneys, lungs, skin, suprarenal capsule and thyroid gland. Torula rarely produces superficial lesions and does not characteristically invade the skin. Many cases of Torula have exhibited the clinical symptoms of Hodgkin's disease. Mallory [5] has observed five such cases. A clear conception of the etiologic relationship of these two rare diseases requires further clinical and experimental study.

Infection of the central nervous system is evidenced by headache, stiff neck, visual disturbances, vomiting, ataxia, paralysis, convulsions, loss of memory, and disturbances of sleep. These symptoms may occur in various combinations, and their clinical interpretation is sometimes confusing. Torulosis may be mistaken for other diseases of the central nervous system, notably tuberculous meningitis and brain tumor. However, the organisms are usually found in large numbers in the spinal fluid and this makes the diagnosis clear.

Marked emaciation usually accompanies the infection wherever it is located. Anemia occurs only in proportion to the malnutrition. There is usually some elevation of temperature. The leukocyte count varies from moderate leukopenia with a normal differential count to a marked elevation of the total leukocytes. The count may reach 30,000 per cubic millimeter with 90 per cent of the leukocytes polymorphonuclear cells. The organism has only rarely been found in the urine.

The disease may run its course in a few weeks or months, or it may persist for years. One case is recorded in which the patient lived for eight years after the onset of the disease. The infection is of low pathogenicity until the central nervous system is invaded. Once this has occurred, the clinical course of the disease is steadily downward with the possibility of only incomplete and temporary remissions. No treatment so far reported has had any effect on the course of the disease.

PATHOLOGY OF TORULA

The pathology of Torula is distinctive. The most characteristic changes are encountered in the central nervous system. The spinal fluid is under increased pressure and contains many yeast cells, but there is a

5. Mallory: Case Record of Massachusetts General Hospital, edited by Richard Cabot, M.D., Case 20241, New England J. Med. **210**: 1291 (June 14) 1934.

striking absence of cellular reaction on the part of the host. The organisms as they occur in the spinal fluid have often been mistaken for red blood cells, and their appearance may deceive experienced observers unless the budding forms are encountered. The meninges show granulomatous changes with fibrous thickening, and their surface is covered by layers of yeast cells. The organisms invade the substance of the brain either by direct extension along the perivascular spaces or, as often happens in the basal ganglions, by embolism. The vessels of the cerebral cortex are surrounded by masses of the organisms, which dissolve out the surrounding gray matter and give rise to large cystlike cavities. It is this lytic action of the cells which gives rise to the name of Torula histolytica. There is little or no cellular reaction against the invasion of the organism and only occasionally a few large macrophages are found in the nervous tissue in the vicinity of the lesion. The cerebellar meninges may be involved but the substance of the cerebellum is rarely invaded. The lesions are seldom encountered in the white matter.

When there is generalized visceral involvement the response on the part of the body gives rise to granulomatous lesions. The granulomatous areas are formed by local hyperplasis of the tissue histiocytes and may or may not include giant cells. Fitchett and Weidman [6] in a recent paper have discussed the pathologic relationship of the lesions to Hodgkin's disease. These observers were able only once to produce lesions in which microscopic examination was suggestive of Hodgkin's disease in laboratory animals experimentally infected by Torula.

SUMMARY

Torula infection in man is a rare disease, but the possibility of its occurrence should be kept in mind in the clinical differentiation of diseases of the central nervous system as well as in the pathologic interpretation of granulomatous lesions.

A generalized systemic torulosis is often accompanied by a microscopic picture that is characteristic of Hodgkin's disease. These two rare diseases appear together much more frequently than may be accounted for by the theory of probability. However, their pathologic relationship has so far not been satisfactorily explained.

28 East Locust Street.

6. Fitchett, M. S., and Weidman, F. D.: Generalized Torulosis Associated with Hodgkin's Disease, Arch. Path. 18: 225-244 (Aug.) 1934.

Bathing During Menstruation.—Should bathing be omitted during menstruation? On this point there has been a considerable change of opinion and practice in recent years. Our grandmothers were certainly as a rule taught that the daily bath must be abjured during menstruation, while now many "modern" girls take a daily shower, or perhaps go in swimming, without regard to menstruation. It would be foolish to lay down hard and fast rules in this respect. It can be said, however, that for the girl who has accustomed herself to a cold bath or a cold shower every morning no harmful effects are to be expected if the cold showers are kept up during menstruation. The tub bath would be objectionable for esthetic reasons. Most girls, however, are accustomed to warm baths, and these can be kept up during menstruation. It is probable that the majority of women depend upon the sponge bath during the period, but if a shower is available, there would seem to be no reason why it should not be enjoyed.—Novak, Emil: The Woman Asks the Doctor, Baltimore, Williams and Wilkins Company, 1935.

SELECTIVELY IRRADIATED ERGOSTEROL

PRELIMINARY COMMUNICATION

T. H. RIDER, PH.D.
GEORGE SPERTI, D.Sc.
G. PARK GOODE
AND
H. G. CASSIDY, M.A.
CINCINNATI

Recent literature on vitamin D and ergosterol irradiation products has been voluminous and it is beyond the scope of the present paper to include more than a brief review of a part of this work. Those who have been interested are well acquainted with the history of the recognition of rickets as a deficiency disease, of the discovery that this disease may be cured or prevented by the administration of cod liver oil or by exposure to sunlight, and of the subsequent discovery that ultraviolet radiation is capable of conferring antirachitic potency on ergosterol or ergosterol-containing materials. It is primarily the irradiation of ergosterol with which we are concerned.

It has not been determined at this time who first irradiated inert materials with ultraviolet radiation to produce in them a substance of value in the treatment or prevention of rickets. There were apparently many contemporaneous workers in the field, among whom may be mentioned Alfred F. Hess, Harry Steenbock, Harry Goldblatt and Katharine M. Soames, Eleanor M. Hume and Hannah H. Smith. It is not our purpose in this paper to review these early developments. Suffice it to say that by the end of the year 1924 it was made quite certain that many initially inert materials could be rendered antirachitically active by ultraviolet irradiation.

Intensive work was carried out in a number of laboratories to discover the nature of the widely distributed substance (or substances) susceptible of being so activated. The search was narrowed down by excellent reasoning and admirable laboratory work until it became evident from chemical, spectrographic and biologic approaches that the provitamin, or at least the most important one, was ergosterol or an unsaturated sterol of very similar constitution.

The discovery of ergosterol as the provitamin by Rosenheim and Webster, Windaus and Hess, and others made commercially possible the production of antirachitic agents for the treatment of rickets. Antirachitic substances prepared by the direct irradiation of ergosterol solutions with ultraviolet rays have been marketed under the generic name viosterol, coined by the Council on Pharmacy and Chemistry of the American Medical Association. Since these products have been made by license under the Steenbock patent (U. S. 1,680,818) they have, apparently, been made by irradiation with "ultra-violet rays, such as are produced by a quartz mercury vapour lamp." The potency of viosterol is standardized by the rat assay, which has been developed to such a point that results are duplicable with relatively small error.

Other antirachitic vitamin preparations that have attracted medical interest have been various irradiated foods, irradiated milk, milk to which a vitamin D containing preparation has been added, and "yeast milk"

From the Research Laboratories, the William S. Merrell Company (T. H. Rider and H. G. Cassidy) and the Basic Science Research Laboratories, University of Cincinnati (George Sperti and G. Park Goode).

V 106
1936

or "metabolized milk" from cows fed a supplement of irradiated yeast.[1]

When milk that had been irradiated by a carbon arc was compared with viosterol in oil in clinical tests, Hess and Lewis [2] reported that it was evident that the milk was the better vitamin source and belonged in the category of "yeast milk" and cod liver oil. On the basis of the number of rat units administered, all three of these products produced a more favorable response in children than did viosterol in oil. This work still needs further investigation.

Two years before this it had been shown that the potency of one antirachitic could not be expressed interchangeably in terms of another. Hess, Lewis and Rivkin [3] found that many more rat units of viosterol than of cod liver oil were necessary to protect or cure infants. In another paper Hess, Weinstock and Rivkin [4] stated that the actions of the two specific antirachitic agents viosterol in oil and cod liver oil were not identical in relation to infantile rickets.

Barnes, Brady and James,[5] in their study of more than 200 children, came to the conclusion that:

It would seem that we are not justified in considering rat units of vitamin D in irradiated ergosterol as being equivalent to the same number of rat units of vitamin D in cod liver oil as a curative or prophylactic remedy for rickets.

In a later paper, Hess and Lewis [2] reemphasized their statement that they had found it necessary to give six times as much viosterol (in terms of rat units) as cod liver oil to protect against or cure infantile rickets.

More recent papers by Hess [6] and by Hess and Lewis [7] have advanced additional original data and have summed up some of these clinical results. These papers also give further bibliographic references.

It appears evident, then, that the rat unit is not wholly satisfactory as a basis of comparison of clinical expectancy from "yeast milk," viosterol and cod liver oil.[8]

This is understandable when one realizes that rickets in the rat is not wholly comparable to that in the human being. Hess, Lewis and Rivkin [3] reasoned that:

When it is borne in mind that there is an essential difference in the pathogenesis of rickets in the rat and in infants, that the former is regularly brought about simply by a lack of phosphorus in the diet, whereas rickets never comes about in infants as the result of such a deficiency, it is not surprising that there should be a difference in their response to antirachitic agents. There has been a tendency to lose sight of the fact that rickets in the rat, although of great experimental value, is not the exact counterpart of infantile rickets. A distinction in the reaction to viosterol and to cod liver oil between the infant and the rat was to be expected, and it became inevitable when it developed that the former had specific phosphate raising properties not possessed by the latter.

1. Schemes for irradiation of milk and its products:
Lesné, E., and Vaglano, M.: Production d'un lait de vache doué de propriétés antirachitiques, Compt. rend. Acad. d. sc. **170**: 539-541, 1924.
Golding, John; Saames, Katharine M., and Zilva, S. S.: The Influence of the Cow's Diet on the Fat-Soluble Vitamins of Winter Milk, Biochem. J. **20**: 1306-1319, 1926.
Wachtel, M.: Die Vermehrung und Vitaminanreicherung der Muttermilch und Kuhmilch mittels bestrahlter Hefe, München. med. Wchnschr. **76**: 1513-1514 (Sept. 6) 1929.
Steenbock, Harry; Hart, E. B.; Hanning, Flora, and Humphrey, G. C.: Fat-Soluble Vitamins: XXX. The Antirachitic Value of Cow's Milk as Modified by the Feeding of Irradiated Yeast, J. Biol. Chem. **85**: 196-214 (Aug.) 1930.
Krauss, W. E., and Bethke, R. M.: Effect on the Vitamin D Content of Milk of Feeding Irradiated Ergosterol to Cows, J. Biol. Chem. **92**: x-xi (June) 1931.
Thomas, B. H., and MacLeod, F. L.: Increasing the Vitamin D Potency of Cow's Milk by the Daily Feeding of Irradiated Yeast or Irradiated Ergosterol, Science **73**: 618-620 (June 5) 1931.
Hess, A. F.; Light, R. F.; Frey, C. N., and Gross, Joseph: A Study of the Milk, Blood, and Excreta of Cows Fed Moderate and Excessive Amounts of Irradiated Yeast or Ergosterol, J. Biol. Chem. **97**: 369-377 (Aug.) 1932.
Krauss, W. E.; Bethke, R. M., and Monroe, C. F.: The Effect of Feeding Irradiated Ergosterol to Cows on the Vitamin D Content of Milk, J. Nutrition **5**: 467-477 (Sept.) 1932.
Gerstenberger, H. J., and Horesh, A. J.: The Treatment of Rachitic Infants with Milk Produced by Cows Fed Irradiated Ergosterol, J. Nutrition **5**: 479-483 (Sept.) 1932.
Hardenbergh, J. G., and Wilson, L. T.: Production of Antirachitic Milk by the Feeding of Dairy Cattle, Am. J. Pub. Health **23**: 230-236 (March) 1933.
Wilson, W. R.: Prevention of Rickets by Milk Fortified with Vitamin D from Cod Liver Oil, J. A. M. A. **102**: 1824-1831 (June 2) 1934.
Hess, Lewis, MacLeod and Thomas.[6]
Mitchell, J. M.; Eiman, John; Whipple, D. V., and Stokes, Joseph, Jr.: Protective Value for Infants of Various Types of Vitamin D Fortified Milk: A Preliminary Report, Am. J. Pub. Health **23**: 1220-1229 (Dec.) 1932.
Hess, A. F., and Weinstock, Mildred: Antirachitic Properties Imparted to Inert Fluids and to Green Vegetables by Ultraviolet Irradiation, J. Biol. Chem. **62**: 301-313 (Dec.) 1924; The Antirachitic Value of Irradiated Cholesterol and Phytosterol: II. Further Evidence of Change in Biological Activity, ibid. **64**: 181-191 (May) 1925.
Steenbock, Harry; Hart, E. B.; Hoppert, C. A., and Black, A.: Fat-Soluble Vitamin: XXVI. The Antirachitic Property of Milk and Its Increase by Direct Irradiation and by Irradiation of the Animal, J. Biol. Chem. **66**: 441-449 (Dec.) 1925.
Supplee, G. C., and Dow, O. D.: The Antirachitic and Calcifying Properties of Summer- and Winter-Produced Dry Milk, Irradiated and Nonirradiated, J. Biol. Chem. **73**: 617-622 (June) 1927; Antirachitic Properties of Irradiated Dry Milk, Am. J. Dis. Child. **34**: 364-371 (Sept.) 1927.
Supplee, G. C.; Flanigan, G. E.; Kahlenberg, O. J., and Hess, A. F.: The Comparative Antirachitic and Calcifying Properties of Irradiated Milk and Milk Derivatives, J. Biol. Chem. **91**: 773-789 (May) 1931.
Supplee, G. C.; Hanford, Z. M.; Dorcas, M. J., and Beck, H. H.: Irradiated Milk: The Amount of Vitamin D and Its Rate of Formation, J. Biol. Chem. **95**: 687-697 (March) 1932.
Supplee, G. C.; Dorcas, M. J., and Hess, A. F.: Irradiated Milk: The Energy Requirements for Antirachitic Activation, J. Biol. Chem. **94**: 749-763 (Jan.) 1932.
Supplee, G. C.; Bender, R. C., and Dorcas, M. J.: Irradiated Milk: The Amount of Energy Required to Prevent Rickets in Chickens, J. Biol. Chem. **97**: 63-69 (July) 1932.
Supplee, G. C.: Antirachitic Activation of Milk by Direct Irradiation with Ultraviolet Rays, Am. J. Pub. Health **23**: 225-229 (March) 1933.
Clinical evidence of favorable results:
Mitchell, Eiman, Whipple and Stokes.
Cowell, S. J.: Irradiation of Milk and the Healing of Rickets, Brit. M. J. **1**: 594-595 (March 28) 1925.
Mackay, H. M. M., and Shaw, H. F.: Foodstuffs Irradiated with Ultraviolet Light: Their Effect on the Bone Lesions of Rachitic Children, Brit. M. J. **2**: 344-345 (Aug. 22) 1925.
Kramer, Benjamin: Rickets in Infants: Treatment with Irradiated Milk, Am. J. Dis. Child. **30**: 195-198 (Aug.) 1925.
Steenbock, Harry, and Daniels, Amy L.: Irradiated Foods and Irradiated Organic Compounds: Therapeutic Possibilities, J. A. M. A. **84**: 1093-1097 (April 11) 1925.
György, P.: Therapeutische Versuche mit bestrahlter Milch bei der Rachitis, Klin. Wchnschr. **4**: 118 (June 4) 1925; Weitere Erfahrungen über Behandlung und Verhütung der Rachitis mit bestrahlter Milch, ibid. **5**: 747-749 (April 23) 1926.
Wieland, E.: Aus der Bestrahlungstherapie der Rachitis, Monatschr. f. Kinderh. **34**: 237-247, 1926.
Scheer, K., and Rosenthal, P.: Die antirachitische Wirkung von in Kohlensäureatmosphäre bestrahlter Milch, Ztschr. f. Kinderh. **44**: 235-244, 1927.
Scheer, K.: Die Behandlung der Rachitis mit in Kohlensäureatmosphäre bestrahlter Milch, München med. Wchnschr. **75**: 642-644, (April 13) 1928.
Hess, A. F; Lewis, J. M., and Rivkin, Helen: The Status of the Therapeutics of Irradiated Ergosterol, J. A. M. A. **93**: 661-665 (Aug. 31) 1929.
Daniels, Amy L.; Stearns, Genevieve, and Hutton, Mary K.: Calcium and Phosphorus Metabolism in Artificially Fed Infants: I. Influence of Cod Liver Oil and Irradiated Milk, Am. J. Dis. Child. **37**: 296-310 (Feb.) 1929.
DeSanctis, A. G.; Ashton, L. O., and Stringfield, O. L.: A Study of the Antirachitic Value of Irradiated Powdered Whole Milk, Arch. Pediat. **46**: 297-311 (May) 1929.
Hess and Lewis.[2]
Hess.[6]
Hess and Lewis.[7]

2. Hess, A. F., and Lewis, J. M.: Milk Irradiated by the Carbon Arc Lamp: A Clinical and Laboratory Study of Rickets, J. A. M. A. **99**: 647-653 (Aug. 20) 1932.

3. Hess, A. F.; Lewis, J. M., and Rivkin, Helen R.: Newer Aspects of the Therapeutics of Viosterol (Irradiated Ergosterol), J. A. M. A. **94**: 1885-1889 (June 14) 1930.

4. Hess, A. F.; Weinstock, Mildred, and Rivkin, Helen: Some Differences in Action Between Irradiated Ergosterol and Cod Liver Oil, Proc. Soc. Exper. Biol. & Med. **27**: 665-666 (April) 1930.

5. Barnes, D. J.; Brady, M. J., and James, E. M.: The Comparative Value of Irradiated Ergosterol and Cod Liver Oil as a Prophylactic Antirachitic Agent when Given in Equivalent Dosage According to Rat Units of Vitamin D, Am. J. Dis. Child. **39**: 45-58 (Jan.) 1930.

6. Hess, A. F.: The Rôle of Activated Milk in the Anti-Rickets Campaign, Am. J. Pub. Health **23**: 1215-1219 (Dec.) 1932.

7. Hess, A. F., and Lewis, J. M.: An Appraisal of Antirachitics in Terms of Rat and Clinical Units, J. A. M. A. **101**: 181-184 (July 15) 1933.

8. The adoption of the international unit both by the U. S. P. Interim Revision on Cod Liver Oil and by the Council on Pharmacy and Chemistry has done away with considerable confusion in the labeling of antirachitic agents with regard to potency. However, it is to be borne in mind that the international unit is also a rat unit. For this reason, even though two antirachitic agents are labeled with the same potency and in the same unitage, this cannot be considered a guaranty of clinical equivalence. In this connection one recalls the interesting statement of C. E. Bills (Physiology of the Sterols, Including Vitamin D, Physiol. Rev. **15**: 1-97 [Jan.] 1935, footnote on page 50) that "there is no reason to consider even the several makes of viosterol identical."

The rather enormous variations in the number of rat units of various antirachitic agents required to produce equivalent clinical results has been recently reported by the late Dr. Hess.[7]

A partial explanation of the discrepancies between the potencies of these antirachitic agents may lie in the fact that the irradiation of ergosterol with ultraviolet rays as developed by the quartz mercury vapor lamp may produce a multiplicity of ergosterol conversion products. It is possible that one of these is the "phosphate raising" factor mentioned by Hess and his associates,[8] which might have a favorable curative effect on rickets in rats but not in human beings. Experiments to elucidate this question are being planned. The fact that the ordinary irradiation of ergosterol leads to the formation of products that have definite physiologic behavior—which may be of a harmful nature—without an effect in calcifying the bones, may be another factor which helps explain these discrepancies.[9]

Laquer and Linsert [10] have found that, by the further irradiation of vitamin D, a product which they name toxisterol may be formed. They have reported that this substance is quite toxic but antirachitically almost inactive. Its maximum absorption occurs at 250 millimicrons, and, since ergosterol after having been irradiated with the full ultraviolet spectrum until no activity remains has a similar maximum absorption, it appears that toxisterol is probably present in any product irradiated in this way.[11]

Reerink and van Wijk [12] and others [13] have shown that more than one product may be obtained in the irradiation of ergosterol if careful differentiation is not made between the longer and the shorter ultraviolet radiations. The possibility that exposure to the full ultraviolet spectrum will destroy the antirachitic factor once formed is also recognized in the Steenbock patent (U. S. 1,680,818).

It is of interest that the discrepancies between the rat and the human activities of antirachitic agents are to some extent paralleled by similar discrepancies between their activities in rats and chickens. As in the case of the human being, the protection or cure of the chick requires more rat units of viosterol than of cod liver oil.[14] The obvious suggestion occurs that a chick assay would be of aid in standardizing antirachitic agents if and when such an assay could be so developed as to give reproducible results.

Numerous attempts have been made to develop a chick assay to replace the commonly used rat assay in order more closely to predict human clinical expectancy. While these attempts, a portion of which have been carried out by us, are significant with respect to our subject, they will not be discussed in detail at this time, since no entirely satisfactory routine test has as yet been developed. Since the cure of rickets in chicks is apparently not attended by the formation of a definite line demarcating new calcification, the test is less amenable to sensitive quantitative interpretation than the rat test and is not at present sufficiently accurate for the adjustment of the potency of commercial medicinal products. We feel, however, that it would serve as a splendid confirmatory test and that as it is developed it may aid in indicating more accurately the clinical results that are to be expected from the assayed products.

In considering the chicken as a possible supplementary test animal for medicinal antirachitics, one fact seems to be of considerable importance; that is, that in the absence of vitamin D the chicken develops rickets in spite of an optimal calcium-phosphorus ratio and content in the diet. In the rat the diet must be definitely unbalanced with respect to these two constituents. Crimm and his co-workers [15] have made the point that a true physiologic action of vitamin D can only be analyzed in the face of an optimal intake of calcium and phosphorus.

The chick test will have to be further developed and standardized before it can be hoped that significant and reproducible quantitative results can be obtained. We are undertaking a further study of this problem because of our belief that such an assay can be adapted to the estimation of clinical expectancy of antirachitic agents from different sources.

A realization that the ordinary form of irradiated ergosterol was less effective for human beings and for chickens than for rats, when compared on the basis of cod liver oil, has led to many investigations of the possible effect of vitamin A on the activity of vitamin D (found with A in cod liver oil). While there may be a definite interrelationship of the actions of these two vitamins, and while the past shortcomings of irradiated ergosterol have stimulated the use of cod liver oil concentrates, as far as we know it has not been demonstrated that the administration of more vitamin A than normally occurs in the diet has had a favorable

9. Windaus, A., von Werder, F., and Lüttringhaus, A.: Ueber das Tachysterin, Ann. d. chem. **499**: 188-191, 1932.

10. Laquer, F., and Linsert, O.: Die biologische Wirkung des Toxisterins, Klin. Wchnschr. **12**: 753-754 (May 13) 1933.

11. Irradiated Ergosterol, Vitamin D and Toxisterol, editorial, J. A. M. A. **101**: 1364 (Nov. 11) 1933.

12. Reerink, E. H., and van Wijk, A.: Vitamin D and Iso-Ergosterol, Nature **132**: 648, 1928; The Vitamin D Problem: I. The Photochemical Reactions of Ergosterol, Biochem. J. **23**: 1294-1307, 1929; On the Photochemical Reactions of Ergosterol, Konik. Akad. Wett. Amsterdam **33**: 845-848, 1929; De bereiding van vitamine-D met behulp van ultraviolet licht, Nederl. maandschr. v. geneesk. **17**: 1-26, 1930; The Vitamin D Problem: II. Optical Rotation of Vitamin D, Biochem. J. **25**: 1001-1010, 1931; Isolation of a Crystalline Antirachitic Reaction Product from Irradiated Ergosterol, Chemistry at the Centenary (1931) Meeting of the British Association for the Advancement of Science, W. Heffer & Sons, Ltd., Cambridge, 1932, pp. 156-158.

13. Everse, J. W. R., and van Niekerk, J.: Het standaardiseeren van vitamine-D-praeparaten, Nederl. tijdschr. v. geneesk. **75**: 1101-1107 (March 7) 1931. Callow, R. K.: Crystalline Preparations of Vitamin-D Obtained by Distillation (Review of the Work of the Research Group at the National Institute for Medical Research), Chemistry at the Centenary (1931) Meeting of the British Association for the Advancement of Science, W. Heffer & Sons, Ltd., Cambridge, 1932, pp. 149-154. Askew, F. A.; Bourdillon, R. B.; Bruce, H. M.; Callow, R. K.; Philpot, J. St. L., and Webster, T. A.: Crystalline Vitamin D, Proc. Roy. Soc., London, s. B **109**: 488-506 (Jan. 2) 1932. Bowden, F. P., and Snow, C. P.: Physicochemical Studies of Complex Organic Molecules: I. Monochromatic Irradiation, ibid. **115**: 261-273, 1934.

14. These references include:
Massengale, O. N., and Nussmeier, Mildred: The Action of Activated Ergosterol in the Chicken: II. The Prevention of Leg Weakness, J. Biol. Chem. **87**: 423-426 (June) 1930.
Hess, A. F., and Supplee, G. C.: The Action of Irradiated Ergosterol on Rats and Chickens, Proc. Soc. Exper. Biol. & Med. **27**: 609-610 (March) 1930.
Mussehl, F. E., and Ackerson, C. W.: Irradiated Ergosterol as an Antirachitic for Chicks, Poultry Sc. **9**: 334-338, 1930.
Mussehl, F. E.: Viosterol in Rickets, correspondence, J. A. M. A. **95**: 1281 (Oct. 25) 1930.
Steenbock, Harry; Kletzien, S. W. F., and Halpin, J. G.: The Reaction of the Chicken to Irradiated Ergosterol and Irradiated Yeast as Contrasted with the Natural Vitamin D of Fish Liver Oils, J. Biol. Chem. **97**: 249-264 (July) 1932.
McDonald, F. G., and Massengale, O. N.: The Antirichetic Potency of Eggs from Hens Receiving Massive Doses of Activated Ergosterol, J. Biol. Chem. **99**: 79-83 (Dec.) 1932.
King, E. J.; Hull, H., and Hall, G. E.: Calcium-Phosphorus Metabolism in the Chicken: IV. Ergosterol Requirements of Growing Chicks, Poultry Sc. **12**: 129-132, 1933.
Bethke, R. M.; Record, P. R., and Kennard, D. C.: The Comparative Antirachitic Efficiency of Irradiated Ergosterol, Irradiated Yeast, and Cod Liver Oil for the Chicken, J. Nutrition **6**: 413-425 (Sept.) 1933.
Russell, W. C.; Taylor, M. W., and Wilcox, D. E.: The Fate of the Antirachitic Factor in the Chicken: III. The Effective Levels and the Distribution of the Factor from Cod Liver Oil and from Irradiated Ergosterol in Certain Tissues of the Chicken, J. Biol. Chem. **107**: 735-746 (Dec.) 1934.

15. Crimm, P. D.; Strayer, J. W.; Watson, H. L., and Heimann, G.: Vitamin Therapy in Pulmonary Tuberculosis: III. The Effect of Viosterol on the Absorption, Retention and Excretion of Calcium, Am. Rev. Tuberc. **28**: 202-216 (Aug.) 1933.

V 106
1936

influence on the activity of irradiated ergosterol.[16] In explanation of these discrepancies, Steenbock, Kletzien and Halpin[16] arrived at the following conclusion:

The vitamin D produced by ordinary irradiation of ergosterol with a quartz mercury vapor lamp is a different substance from that found in cod liver oil. This is concluded from the fact that irradiated ergosterol whether fed in corn oil or in cod liver oil solution shows the same degree of antirachitic efficiency and the same toxicity.

A quotation from a paper by Hess, Lewis and Rivkin[3] is also of interest at this point:

There is no doubt that viosterol, as now produced, contains a number of substances and that the antirachitic factor constitutes only one of the elaborated products. Although we are not yet in a position to determine the best technical procedure, sufficient data are already at hand to render it advisable that, when the mercury vapor lamp is used, filtered rather than unfiltered rays should be employed.

We believe that the work which we have quoted establishes the facts (1) that the ordinary irradiation of ergosterol yields a plurality of products and (2) that the rat assay of such a mixture of products fails correctly to establish their clinical potency.

It is obvious that the use of a single irradiation product which carries antirachitic potency is preferable to the use of a mixture. The isolation of a single active product may be accomplished by the chemical or physical fractionation of ordinary irradiated ergosterol, provided all inert or injurious products of irradiation can be removed in this way. However, the difficulty of making quantitative chemical separations of sterols is great. While it is possible to derive a crystalline product from the ordinary irradiation of ergosterol, it is still quite questionable whether a single chemical compound representing antirachitic potency can be feasibly and economically isolated from such a reaction mixture.

The ultraviolet absorption curve of ergosterol shows a series of peaks. These peaks indicate wavelengths at which radiations are markedly absorbed. As some of these peaks undoubtedly represent the absorptions of different linkages in the ergosterol molecule, it seems probable that at least two types of reaction may occur when the ergosterol molecule is subjected to unselected irradiation.

That change which confers antirachitic potency on the molecule may involve one or more points of structure, and the later destruction of antirachitic potency may involve a continued change of the same portions of the molecule.

On the other hand (with unselected irradiation) the simultaneous absorption at distinctly different wavelengths may induce concomitant reactions in several more different parts of the molecule. These changes may or may not be physiologically significant.

In this connection the almost obvious suggestion occurs that, when compared on the basis of rat units with ordinary irradiated ergosterol, the greater clinical efficacy of "yeast milk" and irradiated milk may well be due in part to a natural filtering process taking place during the irradiation of the yeast and of the milk, respectively. Other factors also are involved, but it is interesting to balance this suggestion against the known absorption of proteins and other substances present which show that the shorter wavelengths are absorbed by these nonsterol cell constituents. In approximately the concentrations in which they occur in the cell, nuclear purines and pyrimidines act as efficient long-wave pass filters with a "cut-off" at about 2,900 angstrom units.

In 1924 we[17] studied energy relationships of biologic reactions and worked toward mathematical expressions for such reactions. We knew that various parts of the spectrum showed markedly different biologic effects. Our point of view was expressed in part as follows:

Experiments have been performed by others in which one part of the spectrum was shown to be much more active than another. Again, experiments have been performed in which it has been shown that there are some biological forms which will be readily attacked by one region of the spectrum and not at all by another.

No experimenters, it seems, have sought for discontinuities in curves in which biological effects have been plotted against wavelengths.

The theory of quanta and the mathematical calculations included in this paper are applicable only if discontinuities occur in these curves. It was in this point of discontinuity, with its possibilities in physical and mathematical applications, that this particular investigation had its inception.

The results of the preliminary experiments reported indicated that the method of reasoning would yield valuable results if applied to the problem of the irradiation of ergosterol.

The discovery that the irradiation of ergosterol with full ultraviolet radiation as produced by the quartz mercury vapor lamp gave a multiplicity of products supported this view, and we have believed that the presence of each of the individual conversion products in such a mixture might be primarily attributable to the effects of radiations of different wavelengths present in the total spectrum developed by the quartz mercury vapor lamp.

The results of the experiments performed by Sperti and his associates indicated that the formation of products other than vitamin D might be prevented and ergosterol transformed into a vitamin D under conditions obviating concomitant destruction thereof by eliminating or filtering out those shorter wavelengths which produced not only the vitamin but also the undesired products.

Further developments of this idea and a comparison with the recent work of Windaus, Reerink and van Wijk[12] and others[13] indicate that such is the case. There are two avoidable types of reaction leading to such a multiplicity of products. It is possible that certain wavelengths will convert ergosterol into an inactive product, and it has been proved, furthermore, that the conversion product which is antirachitically active is in turn further converted into other products without antirachitic value by radiations of wavelengths differing from that which produced the original activation.

The work of Sperti and his associates led to the issuance of a patent, U. S. 1,676,579, pertaining to selective irradiation. It has been demonstrated that ergosterol, when acted on by a portion of the ultraviolet spectrum of longer wavelength, with the exclusion of shorter wavelengths which may form undesired prod-

16. Hess, J. H.; Poncher, H. G.; Dale, M. L., and Klein, R. I.: Viosterol (Irradiated Ergosterol): Prophylactic and Therapeutic Dosage, J. A. M. A. **95**: 316-323 (Aug. 2) 1930. Rohmer, P., and Dubois, R.: L'influence de la "vitamine A" sur l'action de l'ergostérol irradié dans le rachitisme humain, Rev. franç de pédiat. **6**: 604-608, 1930. Russell, W. C., and Klein, D.: The Vitamin A Content of a Ration and the Antirachitic Potency of Irradiated Ergosterol, Poultry Sc. **10**: 269-274, 1931. Glanzmann, E.: Karotin und Vitamin A, Jahrb. f. Kinderh. **133**: 129-162 (Oct.) 1931. Hunter, J. E.; Dutcher, R. A., and Knandel, H. C.: Does Vitamin A Possess Vitamin D-Sparing Properties When Fed to Growing Chicks? Poultry Sc. **11**: 239-240, 1932. Steenbock, Kletzien and Halpin.[16] Jusatz, H. J.: Experimental Study of the Synergism of Vitamins, Ztschr. f. d. ges. exper. Med. **87**: 529-544, 1933. Bills,[2] p. 46.

17. Schneider, Herman, and Sperti, G.: The Quantum Theory in Biology, Institute of Industrial Research, series 4, paper 1, University of Cincinnati, April 2, 1926.

ucts, is converted only into an isomeric product which has pronounced antirachitic potency.

A product prepared by the use of ultraviolet radiations of properly selected wavelengths prepared by license under the Sperti patent is now available.[18] It is a solution of the irradiation product in vegetable oil, the potency of which has been adjusted to 10,000 U. S. P. X (Revised 1934) units per gram.

We believe that with properly selected irradiation the isomeric product or products which result are comparatively free of decomposition products. This belief is substantiated by the results of a study of the near infrared absorption spectrums of ergosterol and irradiated ergosterol by Shelow.[19] She irradiated ergosterol with unfiltered ultraviolet rays and with radiation previously filtered to remove wavelengths shorter than 2,960 angstrom units for various periods of time and compared the near infra-red absorption spectrums of the resulting products with those of ergosterol, an isoergosterol and ergostadienone. Her observations were highly instructive:

> The infra-red absorption spectra of series of samples irradiated through the 2,960 angstrom filter for periods ranging from one to six hours, with 26 to 65 per cent of the ergosterol changed, gave no evidence of decrease in the absorption bands attributed to the alcohol group or of the development of bands associated with the ketone group.

In the case of the ergosterol irradiated with unfiltered ultraviolet the absorption curves could not be reproduced, and there was almost always evidence of production of a ketone. Shelow concludes:

> This preliminary investigation indicates that the alcohol group persists in ergosterol irradiated with wavelengths longer than 2,960 angstroms, while bands usually associated with the ketone group do not appear. The resemblance of the curve of long-wave irradiated ergosterol to that of pure ergosterol and of iso-ergosterol suggests that the product of irradiation is an alcohol isomeric with ergosterol.

Further evidence that irradiation by the method outlined results in the conversion of ergosterol only into a fraction which is antirachitically active is offered by the determination of the potency of the resultant product. The exact amount of ergosterol converted in a test run was determined by a digitonin precipitation of the unchanged material, and the biologic potency of the product was attributed to the converted fraction only. It was found to be more than 40,000 international units per milligram, which approximates the potency of the most active fraction isolated by Windaus, and of "Calciferol," a chemically fractionated irradiation product.

There is as yet little published work on the clinical effects of selectively irradiated ergosterol. Reerink and van Wijk [20] gave a preliminary announcement of the results obtained by Prof. E. Gorter and Dr. J. J. Soer of the Children's Hospital of Leiden, who employed a preparation, prepared by Reerink and van Wijk, of ergosterol exposed to long wave irradiation (wavelengths longer than 275 millimicrons) in the cure of rachitic children. Apparently complete healing was attained in all cases within fourteen days with a remarkably small daily dose. In a later paper by Driessen, Gorter, Haverschmidt and Soer [21] eighteen cases are reported, with many roentgenograms of the wrist and with blood calcium and phosphorus figures. In these experiments a selectively irradiated ergosterol prepared by Reerink and van Wijk was used to treat rickets in children. The results were favorable with very small doses. The material used in these tests was similar to viosterol in oil-Sperti process in the method of irradiation.

As we have pointed out earlier in the paper, the standardization of various antirachitic agents in terms of rat units, even though these rat units are the new international units, cannot give an accurate quantitative comparison of the clinical efficacy of the products in question. Hess [22] found the optimum daily dose of cod liver oil to be approximately 540 international units per day and the approximate necessary daily dose of viosterol (prepared by ordinary irradiation) to be in the neighborhood of 2,240 international units per day. These results appear to be in substantial agreement with those of other clinicians and with Hess's later statements.[7] Possible differences in the clinical effectiveness of viosterol in oil-Sperti process and viosterol preparations prepared by ordinary irradiation can be established only by extensive clinical trial. However, on the basis of the dosages stated, it is estimated that the daily prophylactic dose for infants of viosterol in oil-Sperti process (potency 10,000 U. S. P. X [Revised 1934] units per gram) will fall within a range of from one to four minims per day. This dose is subject to change by the physician (as are all dosages) at his discretion. No direct claims for clinical differences between the two types of viosterol are as yet warranted. Careful clinical studies may indicate such differences.

SUMMARY

Material collected from the literature shows that the clinical potencies of irradiated ergosterols are not as great as would be expected from comparative rat assays of these products and of cod liver oil.

It has been suggested that the discrepancies between the expected and the actual clinical potencies of irradiated ergosterols may have been accounted for in part by the now overwhelmingly evident fact that irradiation of ergosterol with the full ultraviolet of the quartz mercury arc produces a multiplicity of products. Some of these products are known to be inactive physiologically and others to be toxic without appreciable antirachitic activity.

It has been pointed out that irradiation with a properly selected range of wavelengths is capable of transforming ergosterol almost completely into a fraction which is antirachitically active in high degree and which is not contaminated with degradative decomposition products.

A product of selective irradiation of ergosterol is now available It is a vegetable oil solution of the antirachitic factor, the potency of which has been adjusted to 10,000 U. S. P. X (Revised 1934) units per gram.

Consideration of the theoretical discussions and of the sparse European clinical studies of selectively irradiated ergosterol indicates that there will be a possible variation in optimum dosage between the two types of product. Clinical studies are at present under way, and others are planned, to establish the optimum dosages of viosterol-in-oil—Sperti process. Pending the results of such studies, it is recommended that N. N. R. dosages be used.

18. Merrell's Viosterol (Sperti Process) in Oil.
19. Shelow, Elizabeth: The Near Infra-Red Absorption Spectra of Ergosterol and Irradiated Ergosterol, Bull. Basic Sc. Research **3**: 175-200 (Aug.) 1931.
20. Reerink, E. H., and van Wijk, A.: The Vitamin D Problem: I. The Photochemical Reactions of Ergosterol, Biochem. J. **23**: 1304, 1929.
21. Driessen, O. A.; Gorter, E.; Haverschmidt, J., and Soer, J. J.: Onregelmatige stukken: Rachitisbehandeling met D-vitamine: I, Nederl. tijdschr. v. geneesk. **7d**: 4203-4218 (Aug. 22) 1936.
22. Hess, A. F.; Lewis, J. M.; MacLeod, F. L., and Thomas, B. H.: Antirachitic Potency of the Milk of Cows Fed Irradiated Yeast or Ergosterol: A Clinical Test, J. A. M. A. **97**: 370-375 (Aug. 8) 1931.

V 10
1936

CONGENITAL DEFECTS

INCIDENCE AMONG THE SIBLINGS OF THE FIRST CONGENITALLY MALFORMED CHILDREN IN 275 FAMILIES

DOUGLAS P. MURPHY, M.D.
PHILADELPHIA

Married couples who become the parents of a congenitally malformed child, and who contemplate having additional children, frequently inquire regarding the possibility that any subsequent offspring will also be defective. To throw light on this question a consecutive series of families, each having a defective child, was interviewed regarding the development of each sibling of its defective member. The resulting information forms the basis for the present report.

MATERIALS AND METHODS

The death certificate of every individual who was stillborn or who died in the city of Philadelphia during the five year period between Jan. 1, 1929, and Dec. 31, 1933, was inspected. Those revealing the presence of any congenital defect were copied, as were the birth certificates of the same individuals.

The deceased was assumed to have possessed a defect (*a*) if the latter involved the surface of the body or, (*b*) if entirely internal, its presence had been disclosed by operation or necropsy. Certificates with diagnoses failing to conform to these requirements were omitted from further consideration. The data on the certificates were supplemented by (*a*) visits to the homes of the deceased, (*b*) inspection of the maternity hospital records of the mothers and the necropsy notes of the

TABLE 1.—*Chief Diagnosis of First Malformed Child* *

Malformation Diagnosis		Number of Malformed Children
Central nervous system		109
Hydrocephalus, spina bifida	131	
Anencephalus	43	
Monsters not described	11	
Craniorachischisis	9	
Mongolism, cretinism, microcephaly	5	
Gastro-intestinal tract		25
Pyloric stenosis	20	
Intestinal defects	7	
Esophageal defects	4	
Anal defects	4	
Other systems		41
Harelip, cleft palate	11	
Extremity defects	7	
Gastroschisis	7	
Urinary defects	5	
Hernias	4	
Heart defect	1	
Miscellaneous	6	
Total		275

* Showing the diagnosis of the chief congenital malformation possessed by the first defective child to be born in each of 275 families, for which families data were available regarding the development of all offspring. Note the large number of serious malformations of the central nervous system.

defective child, and (*c*) visits and correspondence with the physicians who signed the birth and death certificates.

The visiting of the homes was begun approximately six months after the death of the last defective individual in the series. This work was done by three fourth year medical students, now Drs. Dorothea Killian, T. D. Cuttle and Milton Mazer. For all families included in this report the information was secured from either the parents or the grandmother of the defective individual; in more than 90 per cent of cases the mother was informant.

From the Gynecean Hospital Institute of Gynecologic Research and Department of Obstetrics and Gynecology, University of Pennsylvania School of Medicine.

RESULTS

Among 130,132 certificates for stillbirths and deaths from all causes there were 1,476, or approximately 11.3 per thousand, which recorded the presence of a congenital malformation. This number included diagnoses given as contributory causes of death as well as those stated to have been the chief causes of death.

TABLE 2.—*Chief Diagnosis of Subsequent Malformed Child* *

Malformation Diagnosis	Number of Malformed Children
Hydrocephalus, spina bifida	19
Anencephalus	7
Craniorachischisis	5
Gastroschisis	2
Pyloric stenosis	2
Anal defects	2
Extremity defects	2
Others†	6
Total	43

* Showing the diagnosis of the chief congenital malformation possessed by younger brothers and sisters of malformed children described in table 1. Compare the frequency of the various defects in the two groups.

† One case each of pulmonary stenosis, multiple defects, hernia, harelip, intestinal obstruction and heart defect.

Among the 1,476 certificates there were 890 (60.0 per cent) with satisfactory diagnoses for individuals who died in 884 families. For each of six families a certificate was on file for a second defective child who had also died during the five year period covered by the survey.

The complete reproductive history of a consecutive series of 501 mothers was secured. Of this group 226 (45.1 per cent) experienced no conceptions following the birth of the congenitally malformed child, whereas 275 (54.9 per cent) each bore one or more subsequent offspring.

The chief diagnosis of the first defective child in each of the 275 families is recorded in table 1. Among the latter there were thirty-four families, or 12.4 per cent, that possessed at least one additional malformed child. Twenty-five of the thirty-four families had at least two offspring following the birth of the first defective infant, and nine of the twenty-five each had a total of three malformed children. The defects observed in all later children are listed in table 2.

The outcome of all the 431 conceptions experienced by the 275 mothers following the births of their first, congenitally malformed, offspring are shown in table 3. Of these subsequent conceptions 331, or 76.8 per cent, ended in the birth of full term, normally developed children. The remaining 100 conceptions ended in (*a*) miscarriages or (*b*) the births of malformed, stillborn or premature infants. These unsuccessful pregnancies represented nearly one in four of all those which followed the birth of the first defective child. The forty-three malformed children accounted for approximately 10 per cent of the total subsequent offspring.

The ratio of the number of defective to normally developed children, in each place-in-family following the birth of the first defective child, is expressed in decimal form in table 3, column 4. The subsequent defective children appeared with equal frequency in the first two birth positions immediately following that of the first defective child. Their frequency was decidedly

greater, however, in the third and even later ranks. Statistical treatment of these figures indicated that these differences were significant.

THE INCIDENCE OF CONGENITAL MALFORMATIONS IN THE GENERAL POPULATION

There were 166,451 live births recorded in the city of Philadelphia during the five year period between Jan. 1, 1929, and Dec. 31, 1933. During the same interval 739 of the live born children died, and on their death certificates were congenital defect diagnoses which were considered as having been verified. An additional forty-three individuals, who were born prior to Jan. 1, 1929, died during the five year period in question. If this group is added to the 739 mentioned, it might counterbalance the group that was born in the last part of the period covered by the survey, who died following Dec. 31, 1933, and who therefore were not included in the present figures. The combined figures (739 plus 43, or 782) give a defect rate of approximately 4.7 per thousand of all live births, or one in 213.

TABLE 3.—*Development of Offspring Born Subsequent to Birth of First Defective Child* *

	Subsequent Pregnancies						
		Full Term Child Development			Interrupted		
Order	Number (1)	Normal, Number (2)	Defective, Number (3)	Column 3 Divided by Column 2 (4)	Miscarriages, Number (5)	Premature Births, Number (6)	Stillbirths, Number (7)
First	275	221	18	8.1	27	5	4
Second	94	74	6	8.1	10	2	2
Third	32	19	9	47.3	3	1	0
Fourth	14	9	4	44.4	1	0	0
Fifth	8	4	3	75.0	1	0	0
Sixth	5	3	2	66.6	0	0	0
Seventh	2	0	1	....	0	1	0
Eighth	1	1	0	....	0	0	0
Totals	431	331	43		42	9	6
Percentage	100.0	76.8	10.0				

* Showing outcome of all conceptions of 275 women following the birth of a congenitally malformed or defective child. Data arranged according to order of subsequent pregnancies. Column 4 denotes ratio of defective to normally developed offspring. Note in column 4 the large proportion of defective offspring in the later pregnancies; in column 5, the large number of miscarriages (including abortions).

As shown in table 3, there were 331 full term, normally developed children, forty-three with defects and nine that were normally developed but premature, giving a total of 383 liveborn children. The forty-three defective offspring represented 11.2 per cent of the latter, a defect birth rate of 112 per thousand, or one defective child in each 8.9 births in these families. Since the defect rate in the general population was demonstrated to be 4.7 per thousand, or one defective child in each 213 births, that in families already having one defective child was approximately twenty-four times the former.

COMMENT

The law does not require the registration of congenital defects on birth certificates and does so on death certificates only in case the defect played a rôle in bringing about the death. Consequently there is no recording of malformations on death certificates in cases in which the defect is not lethal in its effect. For this reason many malformations are not registered. The incompleteness of the figures dealing with the frequency of congenital malformations in the general population presented in this report therefore are fully realized but are nevertheless submitted, since they are believed to be the most satisfactory control figures that are available for the present study.

SUMMARY AND CONCLUSIONS

1. A consecutive series of 275 families each known to have possessed a congenitally malformed or defective child, and also one or more subsequent members, was interviewed with regard to the outcome of all conceptions of the mothers.

2. Thirty-four, or approximately 12.4 per cent, of the families gave rise to one or more additional congenitally malformed members.

3. Among 431 conceptions that followed the birth of a malformed child, 331, or 76.8 per cent, ended in the birth of full term, normally developed offspring. The remaining 100, or approximately one in four of the subsequent conceptions, ended in (*a*) forty-three (10 per cent) congenitally malformed children, (*b*) forty-two miscarriages (including abortions), (*c*) nine premature births and (*d*) six stillbirths.

4. In families having one congenitally malformed child, a second one was born once in every 8.9 births, whereas in the general population a congenitally malformed infant appeared only once in every 213 births.

5. From this study it is concluded that offspring presenting congenital malformations which are serious enough to warrant being recorded on death certificates are approximately twenty-four times as likely to occur in families possessing a congenitally malformed child as in the population at large.

PERCENTAGE OF WEIGHT LOSS

A BASIC INDICATOR OF SURGICAL RISK IN PATIENTS WITH CHRONIC PEPTIC ULCER

HIRAM O. STUDLEY, M.D.
CLEVELAND

The general mortality rate among patients suffering from peptic ulcer has been materially reduced by surgical care. The reduction has been due chiefly to early operation in those having one type of ulcer lesion; that is, ruptured ulcer.[1] The rate following operations for chronic peptic ulcer, uncomplicated by rupture or gross hemorrhage, has always been much lower, but proportionate progress in reducing this figure further has not been made. This rate has remained for some time at a relatively stationary level of about 10 per cent,[2] except in selected series. To present further observations on the sequence of events leading to this sustained rate is my object in this communication.

The ordinary patient chronically ill with peptic ulcer is to be dealt with here. Those patients with ruptured peptic ulcer, with acute hemorrhage or with gastrojejunal ulcer are naturally not under consideration, since they all present preoperative and operative conditions which are in no wise comparable to those in patients with the usual chronic peptic ulcer. Those patients who had had previous operations for peptic ulcer, other than anastomotic procedures, however, are included, since these patients present problems of the same type found in many with chronic ulcer coming to their primary operation.

From the Department of Surgery of the University Hospitals and the Western Reserve University School of Medicine.

These patients were studied in the Gastric Clinic of the Departments of Medicine and Surgery of the University Hospitals.

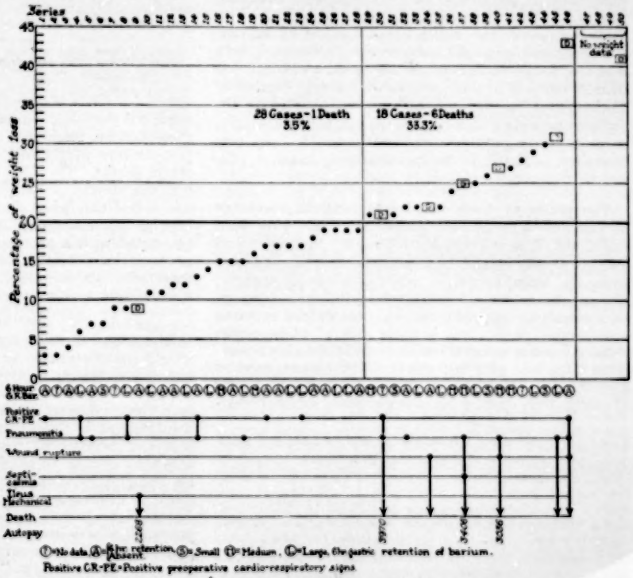
1. Watson, J. H.: Acute Perforating Duodenal and Gastric Ulcers, Brit. M. J. 2:169-173 (Aug. 2) 1930.

2. Hartwell, J. A., and Felter, R. K.: Peptic Ulcer: Surgical Aspects Including End Results, Ann. Surg. 92:602-615 (Oct.) 1930. Gibbon, J. H.: Immediate Mortality in Operations for Gastric and Duodenal Ulcer and Its Causes, ibid. 92:616-619 (Oct.) 1930. St. John, F. B.: Follow-Up Study of Results in Surgical Therapy for Gastric and Duodenal Ulcer, ibid. 92:597-601 (Oct.) 1930.

V 106
1936

The cases of fifty consecutive public ward patients operated on at the Lakeside Hospital for chronic peptic ulcer of nonemergency type were reviewed in a search for a factor or factors contributing to postoperative mortality. Special attention was paid to the following possible factors, which are commonly considered to be of major importance in determining the immediate postoperative outcome: age of the patient, positive preoperative cardiorespiratory signs leading to postoperative pulmonary complications and death, a secondary operation in contrast to a first or primary operation for peptic ulcer, the presence of pyloric stenosis, the location of the ulcer, the type of operation, the duration of the operation, and the surgeon. Detailed study, the results of which are too extensive to be reported here, failed to demonstrate any of these possible factors as being of chief or consistent importance in determining the postoperative mortality rate. It was observed, however, that the patients who died after operation had quite regularly lost preoperatively a considerable proportion of their weight. The relationship between the preoperative loss of weight and the postoperative mortality was consequently chosen for further investigation.

In order to do this, it was found practical to determine the percentage of preoperative weight loss as follows: First, the record of the highest level of weight in health for the patient was noted. This was commonly found under the heading of "best weight." Many of these patients were followed in the outpatient department for months or years before operation, and in some of these repeated weighings showed great variation, associated with remission or recurrence of symptoms. If the record in the outpatient department showed a weight approximately as high as that in the statement of the patient, it was used in preference. Second, the last preoperative weight, commonly found recorded a few days before operation, was noted. This figure subtracted from the highest weight reading was accepted as the number of pounds of preoperative weight loss. This was expressed as a percentage of the highest weight level and was considered as representing the weight lost preoperatively.



Preoperative weight loss. Major postoperative complications. (Preoperative gastric retention of barium sulfate considered in relation to preoperative weight loss and postoperative deaths. Preoperative cardiorespiratory signs considered in relation to postoperative pneumonitis and deaths.)

Of the fifty cases, forty-six were found to have the necessary data for the determination of the preoperative weight loss. In four of the fifty cases a statement of weight was not to be found. It was necessary in twenty-three cases, exactly half of the forty-six, to utilize the best weight figure as given in the patient's statement.

Among the forty-six cases there were seven postoperative deaths, or a mortality rate of 15 per cent. If all patients who had had previous operations for peptic ulcer had been excluded (a usual custom in reports of this kind), the postoperative mortality rate would have been 12.5 per cent.

In the study of the relationship of loss of weight to the postoperative outcome, two preliminary points came up for consideration as possible modifying factors to any correlation. The question arises, would the loss of a certain percentage of weight in a heavy person be as important as the loss of the same percentage in an individual of light or medium weight? Secondly, would the rapidity with which the loss of weight occurred modify any correlation that might be found between the percentage loss of weight and the postoperative outcome? It was found that while each of these considerations might be of significance their importance was relatively small and their modifying influence on the basic question was of no practical value. With these two preliminary considerations excluded as essentially modifying factors, the relationship between the percentage of preoperative weight loss and the postoperative mortality rate was brought out in a striking way by the following procedure:

The patients were arranged in sequence according to the individual percentage weight loss and the series was then arbitrarily divided into three approximately equal groups (table 1): group A, fifteen patients who lost 14 per cent body weight or less; group B, sixteen patients who lost from 16 to 21 per cent; group C, fifteen patients who lost from 22 to 43 per cent. The deaths in the series were found to be distributed as follows: one in group A, one in group B and five in group C.

In group B the single death occurred in a patient who had lost 21 per cent of his weight; in this group of sixteen patients there were only two others, or three in all, who had lost more than 20 per cent of weight. Adding these three to the fifteen patients of group C, each of whom lost a still greater percentage, it is seen that the mortality with one exception (one death in group A) is confined to those who had lost more than 20 per cent of weight prior to operation. The forty-six cases are thus placed in two groups, instead of three, in table 2.

The difference in the mortality percentage between the two groups A and B is more pronounced when it is considered that the one death among the twenty-eight who lost less than 20 per cent of body weight was found at autopsy to be associated with ileus that was of mechanical and not of infectious origin. This death was associated with a lesion that has no appreciable relationship to the subject being discussed here. Thus, with one exception, all the patients who lost less than 20 per cent of their preoperative weight lived to be discharged from the hospital, improved. Among the eighteen patients who lost more than 20 per cent weight, there were six postoperative deaths, or 33⅓ per cent mortality, as shown in the accompanying chart.

COMMENT

The policy of delay in advising surgical treatment of patients with chronic peptic ulcer has long been urged and is now generally followed. Surgical treatment is usually sought only when unrelieved symptoms force the abandonment of other methods of therapy. During the period of delay while full trial is given to medical management the loss of weight is often considerable, particularly in those patients whose symptoms do not adequately respond and for whom operation is advised as a last resort. This phenomenon of a greater loss of weight was found in about 40 per cent of our patients coming for nonemergency surgical treatment of peptic ulcer, and it is likely to develop in any series of cases under good but prolonged medical management.

TABLE 1.—*Preoperative Percentage of Weight Loss and Postoperative Mortality in Three Groups*

Weight Loss Class	Number of Cases	Mean Percentage of Preoperative Weight Loss	Mean Percentage Weight Loss	Deaths
A. Smallest loss	15	14 or less	8.7	1*
B. Medium loss	16	16 to 21	17.8	1
C. Greatest loss	15	22 to 43	26.8	5

* The patient with ileus of mechanical origin.

Since the foregoing evidence shows a high postoperative mortality rate to be closely associated with a large percentage of weight loss preoperatively, the presence of such weight loss in any single patient may function as a readily observable sign of special operative risk.[3] A specific method may be developed for overcoming preoperatively this extra hazard. Such an accomplishment may assist in reducing the postoperative mortality rate in this troublesome field of surgery from about 10 per cent to that level (about 3 per cent) usually associated with other serious major operations for nonlethal diseases.

SUMMARY

The factor of preoperative weight loss was found to be outstanding in a study designed to account for the mortality rate in a series of fifty consecutive patients from the public ward service of the Lakeside Hospital who were operated on for chronic peptic ulcer and who exhibited the usual clinical syndrome. On forty-six of these patients there were found comparable data on the preoperative weight loss, and among these there were seven deaths. On four patients, among whom there was one death, the weight data were not present. It was found that when the weight loss factor reached as high as approximately 20 per cent or above, it was associated with a postoperative mortality rate of 33⅓ per cent in contrast to a rate of 3.5 per cent among those who had lost less weight, e. g., were in better preoperative condition according to this standard.

TABLE 2.—*Preoperative Percentage of Weight Loss and Postoperative Mortality: Cases Arranged in Two Groups*

	Mean Percentage Weight Loss	Number of Patients	Deaths
Group A. Those losing less than 20 per cent	12.6	28	1*
Group B. Those losing more than 20 per cent	28.1	18	6

* The patient with ileus of mechanical origin.

CONCLUSION

The physical state represented by a large loss of weight constitutes a major hazard faced by those suffering from chronic peptic ulcer. It must be included along with rupture of the ulcer and serious hemorrhage as a third possible major complication in the medical management of these patients, as some of them are of necessity transferred for surgical care in this state, which was found to exhibit a high operative risk. By the recognition of this phenomenon an additional basic guide in estimating surgical risk is obtained, and there is reason to believe that more patients will be saved, provided efforts are concentrated on the preoperative preparation of those who have lost a good deal of weight, regardless of other appearances in the individual.

1324 Hanna Building.

Sir Ronald Ross and Mosquito Day.—On Aug. 20, 1897—afterward always called mosquito day—he found in the stomach of mosquito No. 37, which had been fed on the 16th, "a great white expanse of cells." Ross continued to look and observed that each cell had a circular outline with pigment granules inside. Next day, mosquito 39 was examined, a day further removed from the feeding: there were the cells again, only much larger; they had grown in twenty-four hours. Therefore, as they contained pigment exactly like that in the crescents, they were almost certainly malarial parasites growing in the mosquito, and this was the stage of development after five days in the mosquito's stomach. These white cells, called "zygotes," were shown later to be the female. The night between examining No. 37 and No. 39 was spent in agony lest 39 should die, it being then the sole survivor of the batch. . . . Manson arranged for the publication of Ross's discovery in the *British Medical Journal*, Dec. 18, 1897.—Hale-White, Sir William: Great Doctors of the Nineteenth Century, Baltimore, William Wood & Co., 1935.

3. D. M. Berkman (Preoperative Management in Cases of Gastric Retention, M. Clin. North America 5:411 [Sept.] 1921) has identified gastric retention as associated with special operative risk, whereas E. S. Emery Jr. and R. T. Monroe (Peptic Ulcer, Arch. Int. Med. 55:271-292 [Feb.] 1935) have designated hypersecretion. J. F. Weir (Preoperative Treatment of Complications of Gastroduodenal Disease, M. Clin. North America 11:1407-1413 [May] 1928) in addition to gastric retention has emphasized vomiting, pain and fatigue. A. J. Walton (Prognosis in Surgical Treatment of Peptic Ulcers, Lancet 2:37-39 [July 7] 1934) suggests, concerning a group of patients with a higher postoperative mortality rate, the severity of the illness as a general factor of note. The percentage of preoperative weight loss, as noted above, may measure the significance of these various manifestations in the estimation of the patient's ability to undergo operation safely.

Clinical Notes, Suggestions and New Instruments

HUMAN PARASITIZATION WITH GORDIUS ROBUSTUS

W. Y. SAYAD, M.D.; V. M. JOHNSON, M.D., WEST PALM BEACH, FLA.
AND
E. C. FAUST, PH.D., NEW ORLEANS

Nearly all known animals, including man, are liable to be hosts, or dwelling places, for various kinds of parasites. Many of these parasites are commonly known to the medical world as well as to the public. The parasite that is to be described belongs to the gordiid worms, of which two species are widely distributed in the United States. They are Gordius robustus and Paragordius varius, both of which were described by the physician-naturalist Joseph Leidy in 1851. The former species has a smooth cuticula; the latter, a rough cuticula provided with tuberculations and tufts of short hairs, or cilia, arising from the tips of some of the tubercles.

The literature records several cases of parasitism or pseudo-parasitism of man by gordiid worms from various localities including France, Italy, Bavaria, Dalmatia, East Africa, South-east Africa, West Africa, the Transvaal, Chile, the United States and Canada. The worms described from the five cases previously reported as occurring in the United States probably all belonged to the species Paragordius varius (Leidy) 1851, although only three were specifically diagnosed. In all the published reports of human infestation the worms were either vomited or passed by rectum and there was no definite proof that they were ever human tissue parasites.

The Gordiacea, or "horsehair worms," are familiar to naturalists, who find them as light or dark brown wiry objects in quiet pools of fresh water, among grasses growing at the water's edge, or emerging from grasshoppers, crickets or beetles in contact with water. The adults may reach a meter or more in length by nearly a millimeter in greatest diameter but are usually somewhat smaller. The sexes are separate, the males being distinguished by their darker color and bifid posterior end. On insemination in water the female discharges long strands of snow-white eggs, which soon become brown. Development of the embryo within the egg shell requires about one month, whereupon the motile larva, with a protrusible proboscis, armed with three retractile stylets and three circlets of spines, emerges. These larvae first sink to the bottom of the water but later actively bore their way indiscriminately into living animal tissue in the immediate vicinity. In inappropriate hosts they are said to encyst and usually fail to develop further; however, in appropriate hosts, including amphibious insects or those which accidentally fall in the water, they metamorphose in the course of several months into juvenile threadlike worms in the body cavity of the host, later emerge into the water, rapidly mature and perform their sexual processes.

The case to be considered in this paper is worthy of report because we have been unable to find a similar case reported in the literature. Furthermore, its recording may serve as a stimulus for the pathologic investigation and study of similar tissue reaction encountered by others. The portal of entry may be of interest to the otolaryngologist, and the final location to the ophthalmologist.

REPORT OF CASE

F. S., a white man, aged 37, residing in southern Florida, telephoned the senior author from a neighboring town Nov. 27, 1934, past midnight, that he had an abscess in the vicinity of his left eye and that it had caused his eye to be very red and painful. When he was seen an hour later, the lower lid was considerably swollen, red and tender. There was definite chemosis of the bulbar conjunctiva. At the lower margin of the orbit and about half way between the two canthi was a tumor-like mass about the size of a small bean. The mass was hard, it was not easily movable, and it did not fluctuate. It was quite apparent that the condition was characteristic of a tumor mass with secondary inflammation rather than an abscess formation. Further questioning revealed that he had first noticed the existence of the mass about two months previously and that it had continued to grow slowly until one week prior to his visit, when it began to swell rapidly and to become inflamed. There had been no itching sensation and very little pain, but the swelling of the lower lid and the threatening involvement of the eyeball had caused him to seek medical advice.

The following day, under local anesthesia and through a linear skin incision, the mass was excised and the skin wound closed. An induration and redness persisted for several weeks, although the skin edges themselves closed rapidly. This perhaps may be attributed to the inflammatory condition of the skin and the surrounding tissues, caused by toxic excreta and the recent activity of the parasite. At the time of the operation, removal appeared complete and the tumor mass appeared completely encapsulated.

The specimen was sent to Dr. Johnson, pathologist at the Good Samaritan Hospital, who found that grossly the specimen consisted of a pseudo-encapsulated mass of reddish, gray, roughly oval tissue. It measured 2.5 by 1 by 1 cm. On section it presented a pinkish gray fibrous wall, which surrounded a roughly oval cavity, containing a thin serous material, small suspended white flocculent particles and a small worm. The latter was of a waxy white color and, in part, semitransparent. It was irregularly coiled and measured approximately 4 cm. in length. Only a portion was removed from the tissue, it being desired to section the remainder in situ.

Microscopic examination revealed the picture more or less typical of any host reaction to a foreign body. There was a well defined central zone occupied by a sectioned part of the worm, serum and polymorphonuclear cells. About this was an edematous pseudo-wall of fibroblasts and fibrin, surrounded in turn by a dense inflammatory tissue, rich in macrophages, lymphoid cells and eosinophilic cells. Scattered aggregates of giant cells of the foreign body type were noted. About the entire lesion were fibers of skeletal musculature, leading one to believe that the lesion developed primarily within the muscular layer.

For further identification the specimen was sent to Dr. Faust, professor of parasitology in the department of tropical medicine at Tulane University School of Medicine. He observed that the worm was small, with an estimated measurement of not more than 50 mm. and a greatest diameter of 0.38 mm. (camera lucida tracing of section). When the specimen was received, one part of the worm was in a block of tissue embedded in paraffin, while the longer part was embedded separately. Serial sections of the first portion revealed evidence of a roundworm in a pocket of host tissue. The second portion was dissolved out of the paraffin and gradually transferred to pure glycerin, in which medium it was carefully studied as a toto mount under the microscope.

The sections demonstrated that the worm possesses a cuticula, hypodermis and somatic musculature of a type peculiar to gordiid worms, with a more or less thin homogeneous smooth outer cuticle, next a thicker layer of crossing diagonal fibers, third a thin layer of nucleated, glandular and nerve elements constituting the hypodermis, and finally a very thick layer of muscle fibers. Internally, a large cloaca and nearby a ventral nerve cord complex could be seen; likewise there was a meshwork of mesenchymatous cells with a few large nuclei, which filled the body cavity. There was only a slight suggestion of developing mesenteries. This portion, from which the sections had been cut, was found later to constitute the subcaudal portion of the worm. The caudal extremity was apparently not in the material sent for identification.

The toto mount was about 40 mm. long, creamy white and cylindric, gradually narrowing toward the extremity which proved to be the anterior end. This end was truncated and possessed no pigmented annulus. It had a slight oral depression opening inward into the esophagus which, in turn, could be traced to the midintestine. The rectum and a pair of immature ovarian cords also were identified. No "eyes" were observed.

On the basis of these several differentiating structures, in spite of the absence of the caudal extremity, the evidence definitely limits the worm to a female gordiid and, in view

Read by Dr. Sayad before the Pan American Medical Association en route to Brazil, South America, in July 1935.

of the smooth cuticula, to the genus Gordius. It is impossible to assign it to a species, although it is not unlikely that it is a specimen of the common American species, Gordius robustus. The specimen may therefore be referred to as an immature "white" Gordius. This is presumably the first record of this genus reported as a parasite of the human host in North America, and the first authentic record of its actual parasitism in human tissues.

It is a matter for conjecture as to how this worm became a human tissue parasite. The most plausible explanation seems to be that the young newly hatched larva was taken into the mouth in raw drinking water, penetrated into the tissues of the cheek and set up a focal tissue reaction, which pocketed it off but did not produce actual encystment, since there was adequate space for the worm to move about within the pocket. It is impossible to state how long the worm had been in the tissue pocket, but the stage of development of the female gonads would indicate a period of several months. The worm was small and sexually immature but normal otherwise. Perhaps the "dwarfism" may be attributed to its lodgment in an abnormal warm-blooded host; but there was no indication that the worm was degenerate. Certain it is that the worm had invaded the tissues of a human host, had produced a local tissue reaction and was alive at the time the tumor mass was removed from the patient.

After establishing the identity of the parasite we were able to learn that the patient is an ardent fresh-water fisherman, frequenting nearby sloughs and ponds. On several occasions he drank or washed his mouth with water from such places.

SUMMARY

A case of human parasitism by a gordiid worm, presumably the species Gordius robustus, was observed. We believe this to be the first authentic case of its kind to be reported in the literature.

MASSIVE LEFT AURICLE

LOUIS FAUGERES BISHOP JR., M.D., AND ANDREW BABEY, M.D., NEW YORK

Because of its comparative rarity, massive left auricle has stirred considerable interest since its original description in 1901 by Owen and Fenton.[1] We therefore record the following case:

REPORT OF CASE[2]

A white American woman, aged 33, married, admitted to Bellevue Hospital, Nov. 22, 1934, complained of pain in the right lower part of the chest and shortness of breath. The distress had commenced two hours before entry, was sudden in onset and was not associated with any type of exertion.

Her previous history showed an attack of rheumatic fever at the age of 15 years, and at this time she was confined to bed for seven months; after improving, she was told that she had a heart murmur. Following the first attack she had six other episodes of rheumatic polyarthritis, each of which was quite severe, necessitating long periods of bed rest; the last of these attacks occurred four years before entry. For the past ten years she had been taking small doses of digitalis. At no time had there been any definite decompensation. In 1931, three years before entry, she had a left hemiplegia.

Her subjective cardiac complaints began about twelve years before, when she noticed marked palpitation on slight exertion or after emotional stress. There had been dyspnea on exertion for about ten years, but it had never been extreme. Six years before her admission to the hospital she had been able to walk to the top of the Statue of Liberty unaided. There had been intermittent ankle edema for about six years and definite orthopnea for many years. For about two years she had had difficulty in swallowing liquids and a slight nonproductive cough.

Physical examination on admission revealed dyspnea, orthopnea and slight cyanosis. Mentally the patient was clear, but she talked in a slow, drawn-out monotone, and there was some dysarthria. The temperature was 99 F., pulse 100, and blood pressure 120 systolic, 90 diastolic. The thorax was thin and asymmetrical, the left side being more prominent than the right. Two pulsations were noted, both systolic in time, one in the seventh left interspace in the midaxillary line and another in the third right interspace about two finger breadths from the outer edge of the right side of the sternum. A forceful apex impulse of the heart was felt in the seventh interspace in the anterior and midaxillary lines. Here too a systolic thrill was felt. On the right, cardiac dulness was noted from the third interspace down, merging below with liver flatness. There was a systolic murmur, followed by an early diastolic murmur. The systolic sound was audible, far to the right, across the sternum and under the nipple. The pulmonic second sound was accentuated. The rhythm was totally irregular. Both sides of the chest were hyperresonant except at the right base, where there was impairment of the percussion note, and in the right lower axilla, where marked tympany was noted; over the latter area breath sounds and voice were practically absent. The remainder of the chest examination revealed many coarse, bronchial râles.

Fig. 1.—The density occupying the lower two thirds of the right side of the chest is the left auricle.

Except for a tender, nonpulsatile liver, which extended over a hand's breadth below the costal margin, examination of the abdomen was negative. The left upper and lower extremities showed marked wasting.

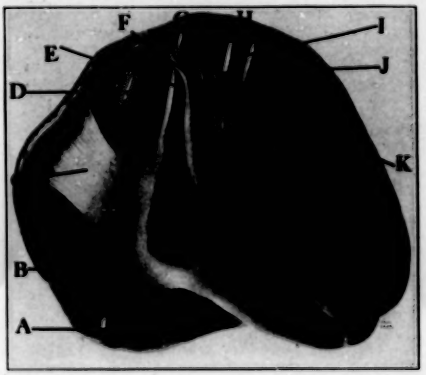


Fig. 2.—Anterior view: *A*, inferior vena cava; *B*, left auricle; *C*, adhesions between lung and pericardium; *D*, pulmonary vein into left auricle; *E*, superior vena cava; *F*, innominate artery; *G*, carotid artery; *H*, subclavian artery; *I*, arch of aorta; *J*, pulmonary artery; *K*, pulmonary veins.

Laboratory examinations, including blood, blood chemistry, Wassermann and urine, were negative.

An electrocardiogram showed auricular fibrillation, right axis deviation and bundle branch defect.

On roentgen examination the density occupying the lower two thirds of the right side of the chest was considered to be the left auricle (fig. 1).

1. Owen, I., and Fenton, W. J.: Clin. Soc. Tr., London **34**: 183, 1901.

2. Case observed in the Fourth Medical Division, Bellevue Hospital, in the service of Charles H. Nammack, M.D., director.

V 106
1936

During fluoroscopy, it was noted that the esophagus was compressed and pushed back to the right. The column of barium sulfate was seen to become very thin where the left auricle was compressing the esophagus. With each systolic pulsation of the heart the column of barium moved upward.

The patient was given morphine and oxygen and was rapidly digitalized. In less than twenty-four hours she was extremely comfortable and was no longer dyspneic or orthopneic. Maintenance doses of digitalis were given thereafter, and except for a slight rise in temperature due to an infection of the upper respiratory tract, her course was completely uneventful, until December 27, when she suddenly began to fail and died of congestive heart failure (about a month after admission).

The autopsy was performed by Dr. W. Hutcheson. When the sternal plate was removed, the largest part of the thorax was seen to be occupied by an enlarged heart, the apex of which was united to the left axillary wall by firm, fibrous adhesions at the level of the seventh rib and the right border of which was in contact with the right axillary wall. There were a moderate number of firm, fibrous adhesions between each lung and the chest wall. There was no fluid in either pleural space.

The heart was removed intact with the lungs. The visceral and parietal layers of the pericardial sac were everywhere united, producing complete obliteration of the pericardial space. On careful examination of the anterior and posterior surface of the heart, the largest part of the cardiac mass was seen to

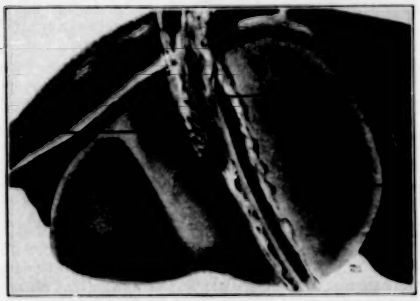


Fig. 3.—Posterior view: *A*, aorta; *B*, esophagus; *C*, left auricle.

consist of a tremendously dilated left auricle, which measured approximately 12 cm. in diameter (fig. 2). The enlargement of the auricle had taken place particularly to the right, so that it was the enlarged left auricle which formed the right border of the heart and was in contact with the right side of the thoracic cage. The part of the left auricle that was visible anteriorly constituted about one half of the anterior aspect of the heart, the remainder consisting of right auricle, right ventricle, and a portion of the left ventricle. The posterior aspect of the heart (fig. 3) was formed mostly by the left auricle and the left ventricle, and it is from this aspect that one can best appreciate the disproportionate enlargement of the left auricle, which was over twice the volume of the two ventricles combined. The capacity of the left auricle, as shown by distention of it with water, was 1,550 cc., compared with the left ventricle, which held 75 cc. The left ventricle was slightly dilated and hypertrophied moderately. The right side of the heart was not dilated, but the right ventricle showed some hypertrophy. When the heart was opened after fixation, the endocardium of both auricles and ventricles was seen to be natural throughout. The tricuspid, pulmonary and aortic valves were essentially normal. The mitral valve on the other hand, as observed from the interior of the left auricle, consisted of a sickle-shaped opening 4 cm. between its two extremities and 6 mm. across at its widest point (fig. 4). When the mitral valve was opened, both leaflets were seen to be extremely fibrosed, thickened and stiffened. The edges were rounded, the chordae tendineae were shortened and thickened, and there was considerable fibrosis of the apexes of the papillary muscles. The chordae tendineae were short and the valve leaflets were so stiff as to preclude the approximation of the latter, so that an anatomic insufficiency was present. The stiffness of the leaflets likwise prevented them from fully opening out to assume the normal cross-sectional area of the mitral orifice, so

Fig. 4.—Mitral valve observed from interior of the left auricle.

that some small degree of mitral stenosis was present, as was also shown by the fusion of the two leaflets on either side of the orifice. There was also a firm, apparently partially calcified, raised plaque in the posterior leaflet of the mitral valve. The measurements of the free edges of the valves were:

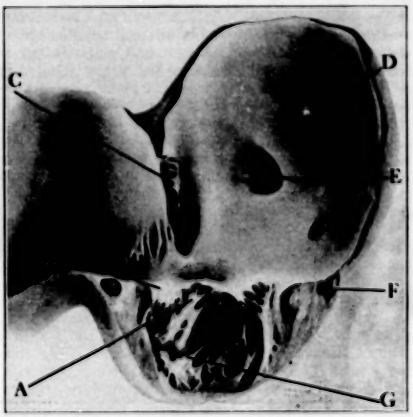


Fig. 5.—Sagittal view: *A*, thickened, shortened chordae tendineae; *B*, fused cusps of mitral hand; *C*, auricular appendage; *D*, left auricle; *E*, fossa ovalis; *F*, coronary sinus; *G*, moderator band.

tricuspid, 14 cm.; pulmonary, 7 cm.; mitral, 9 cm., and aortic, 6 cm. The left ventricle was 1 cm. thick at its widest portion, the right ventricle 6 mm. On section, the myocardium of the ventricles showed no fibrosis or other change, and the coronary vessels were normal as far as they could be followed.

The lungs were small; crepitation was normal throughout except in the right lower lobe, which was dark red, shrunken and airless. On section, the parenchyma of the entire left lung and upper two lobes of the right was a pinkish white. The cut surfaces of the right lower lobe were moderately dense, reddish and uniform. A moderate amount of anthracotic pigment was present.

The esophagus was normal except that it was somewhat compressed and pushed over to the right by the enlarged left auricle. It lay along the posterior aspect of the left auricle, looking something like a thin rubber tube stretched across the surface of an inflated balloon (fig. 3). The remainder of the gastro-intestinal tract was not examined.

Microscopic sections were done through the dilated wall of the left auricle. The section of the wall of the left auricle was characterized by a marked thinning of the muscle layer, the myocardium occupying but a small proportion of the entire thickness. A number of blood vessels cut in cross-section and longitudinal section showed no striking change or disease.

COMMENT

We wish to emphasize the importance of keeping in mind the phenomenon of a massive left auricle to avoid mistaking this condition not only for effusions of various types but for malignant conditions of the gastro-intestinal tract or mediastinum.

121 East Sixtieth Street.

Special Article

COOPERATIVE CLINICAL STUDIES IN THE TREATMENT OF SYPHILIS

SYPHILIS IN PREGNANCY

HAROLD N. COLE, M.D., CLEVELAND, WITH LIDA J. USILTON, M.A., WASHINGTON, D. C., AND JOSEPH EARLE MOORE, M.D., BALTIMORE; PAUL A. O'LEARY, M.D., ROCHESTER, MINN.; JOHN H. STOKES, M.D., PHILADELPHIA; UNO J. WILE, M.D., ANN ARBOR, MICH.; THOMAS PARRAN JR., M.D., ALBANY, N. Y., AND R. A. VONDERLEHR, M.D., WASHINGTON, D. C.

Fetal and neonatal death in syphilitic mothers is much greater than in nonsyphilitic mothers. In Bill's [1] obstetric clinic at Western Reserve University it was found that among 6,098 women pregnancy resulted in stillbirth four times as often in syphilitic as in nonsyphilitic women. Moore [2] reports that an untreated syphilitic woman has only one chance in six of bearing a living, healthy child, as compared with three chances in four for a healthy woman. Among the children born alive of syphilitic mothers both the mortality and morbidity rates are much higher than among the children born of nonsyphilitic mothers.

It is difficult to establish a general base line to estimate the extent to which arsenical and bismuth therapy have reduced infant mortality. Sylvester,[3] studying a group of infants with clinically recognizable syphilis from 1901 to 1914, before the Wassermann reaction was employed, estimated that mortality among these cases was approximately 85 per cent within the first year of life. During the period 1915 to 1919, when the serologic blood test for syphilis became generally available and the newly discovered specific drug arsphenamine first came into use, the mortality dropped to 33 per cent. Undoubtedly this decrease in infant mortality was influenced not only by the use of the new therapy but also by the inclusion of infants whose subclinical syphilis had not been detectable before the institution of the Wassermann test. From 1920 to 1925, when, in addition to better diagnostic and therapeutic measures, there were organized syphilis clinics with social service, infant mortality within the first year of life dropped to 21.5 per cent. Incomplete and incomparable though these data are for the specified periods, they indicate a definite decline in the mortality of infants with syphilis. Sylvester further attempted to study the morbidity of infants in these three periods. He reported that a syphilitic child apparently was more susceptible to colds, otitis media, pneumonia and other nonsyphilitic infections than was the nonsyphilitic child. He estimated the morbidity among syphilitic infants in the first period as 85 per cent, in the second period as 50 per cent and in the third period as 35 per cent.

The Cooperative Clinical Group has studied the pooled records from five large syphilis clinics to determine the outcome of pregnancy in treated syphilitic women. This study comprised 3,817 syphilitic women under treatment or observation for six months or more. There were 603 women who had 922 pregnancies after their syphilitic infection. The results of 607 of these pregnancies are known and form the basis for the statements in this paper.

SIGNIFICANCE OF A SEROLOGIC BLOOD TEST OF THE MOTHER DURING AND AFTER PREGNANCY

The results of serologic blood tests on syphilitic women during pregnancy give some information as to the chances of transmission of syphilis to the unborn child. Among 167 syphilitic women with a negative blood reaction during pregnancy, 81 per cent were delivered of a living, apparently nonsyphilitic child, in contrast to 57 per cent of the 264 syphilitic women with a positive blood reaction during pregnancy. These data indicate that in the syphilitic woman a negative reaction during pregnancy greatly increases the chances for a living, apparently nonsyphilitic child. It is obvious, however, that the negative status of the serologic blood reaction is insufficient in itself to insure a living, apparently nonsyphilitic child. Undoubtedly there are other equally important factors influencing the transmission of syphilis, since only 81 per cent of the syphilitic mothers with negative reactions were delivered of living, nonsyphilitic infants. In a subsequent analysis of the same cases, disregarding the blood reaction during pregnancy, it was found that adequate treatment of the mothers when begun early in pregnancy resulted in the delivery at term of apparently nonsyphilitic children in 91 per cent of the cases. This treatment factor is considered in more detail in the latter part of this paper. A division of the material by stage of the mothers' infection at the time of conception revealed that among syphilitic women with negative blood reactions during pregnancy the stage of infection apparently was not a definite factor in the transmission of syphilis to the child. On the other hand, among the syphilitic women with positive blood reactions during pregnancy the stage of the mothers' infection was of paramount importance.

The chances for a living, nonsyphilitic child were increased 50 per cent in those cases in which the mother's serologic blood reaction was positive but the infection had passed the early stages before the occurrence of pregnancy. It was found that 31 per cent of

From the U. S. Public Health Service (Lida J. Usilton, Dr. Parran and Dr. Vonderlehr) and the Cooperative Clinical Group (Drs. Cole, Moore, O'Leary, Stokes and Wile).

Conducted by the cooperation of the syphilis clinics of the Western Reserve University, the Johns Hopkins University, the Mayo Clinic, the University of Pennsylvania and the University of Michigan, assisted by the U. S. Public Health Service and supported by a special fund contributed by an anonymous donor and a grant by the Milbank Memorial Fund.

1. Bill, A. H.: Personal communication to the authors.
2. Moore, J. E.: Modern Treatment of Syphilis, Springfield, Ill., Charles C. Thomas, 1933, pp. 250, 254.
3. Sylvester, P. H.: Twenty-Five Years of Congenital Syphilis in Boston, J. A. M. A. 87:298 (July 31) 1926.

V 106
1936

the women with early syphilis who had positive blood reactions during pregnancy bore syphilitic infants. As the duration of the infection increased and the disease became late or latent before conception, the transmission of syphilis to the child decreased to 18.5 per cent.

Regardless of the stage of syphilis, a positive blood reaction during pregnancy is a serious matter. Ten times as many syphilitic children were born when the mother's blood was positive during pregnancy as when it was negative.

From the foregoing facts it is concluded that, in order to insure a living, nonsyphilitic child, it is highly desirable to treat intensively throughout each pregnancy every woman who has ever had syphilis. This procedure should be followed whether the blood reaction during pregnancy is positive or negative or the infection is of short or long duration.

Serologic blood tests of the syphilitic mothers after delivery of 217 living, apparently nonsyphilitic infants showed that 67 per cent had negative blood reactions and 33 per cent positive ones. The results are more striking among those syphilitic mothers who bore living syphilitic infants, as 82 per cent of these had positive blood reactions and 18 per cent had negative ones. Thus, while the positive reaction on the syphilitic mother indicates the probability of transmission of syphilis to the child, the negative reaction on the syphilitic mother does not guarantee the birth of a living, nonsyphilitic child. There may be occasional positive serologic blood reactions on syphilitic mothers of nonsyphilitic children or negative reactions on mothers of syphilitic children; therefore it is always necessary to perform repeated blood tests on the child and to consider all available data before deciding whether or not the child is syphilitic. It is unfortunate that, in this series of cases, information regarding transmission of syphilis to the child is limited to that obtained at birth. In order to rule out syphilis in these children definitely they should be followed during at least the first two years of life.

THE SYPHILITIC MOTHER'S TOLERATION OF ARSENICAL TREATMENT

As the kidneys and liver of the pregnant woman are already under some strain, it might be expected that antisyphilitic treatment would be harmful. This, however, was not the case. There was no significant difference in minor arsenical reactions in the pregnant and nonpregnant groups. However, the pregnant woman experienced fewer severe reactions than the nonpregnant one. There were 3.08 severe arsenical reactions per thousand injections in nonpregnant women as compared with only 0.87 per thousand injections in those pregnant.[4] The pregnant woman was given an average of eighteen injections of arsenicals throughout her whole treatment period, while the nonpregnant woman was given nineteen injections. Arsenical dermatitis was twice as frequent and icterus five times as frequent in the nonpregnant as in the pregnant group. Since the pregnant woman apparently stands arsenical therapy as well as or better than the nonpregnant one, the physician need not withhold arsenical treatment for fear of irritating the kidneys or for fear of causing other arsenical reactions. Nevertheless, the same vigilance should be exercised in treating a pregnant woman as any other patient, since there is always some risk involved in antisyphilitic treatment.

TREATMENT OF THE PREGNANT SYPHILITIC WOMAN

If the diagnosis is made early, an intravenous injection of arsphenamine (from 0.2 to 0.4 Gm.) or neoarsphenamine (from 0.3 to 0.6 Gm.) should be given every week for from twelve to fifteen weeks, followed by ten weekly injections of either potassium bismuth tartrate (0.2 Gm.), bismuth salicylate (0.2 Gm.) or sodium potassium bismuth tartrate suspended in oil, each dose yielding from 0.05 to 0.1 Gm. of metallic bismuth each. If possible the schedule should be arranged to finish up with an arsenical, and treatment should be continued to term. If the diagnosis is made late in pregnancy, combined arsenical and bismuth treatment is indicated. Even late, inadequate treatment may mean a living, possibly nonsyphilitic child.

THE TREATMENT OF HABITUALLY ABORTING SYPHILITIC WOMEN

It is well known today that abortions are not necessarily caused by syphilis. Yet, in a small group of sixty-three syphilitic women who had had two or more abortions previously, 59 per cent bore living, apparently healthy children after having been given antisyphilitic treatment. Such results demonstrate that habitually aborting syphilitic women should be given antisyphilitic therapy throughout their pregnancies.

RESULTS OF EARLY AND ADEQUATE TREATMENT IN PREGNANCY

As early as possible in pregnancy the physician should examine every woman for syphilis. The history should be taken carefully and one or more serologic tests made.[5] The sooner syphilis is diagnosed and the earlier the treatment is begun, the better the prognosis for a living, nonsyphilitic child. In the Cooperative Clinical Group material 167 syphilitic mothers received treatment which was begun before the fifth month of pregnancy, and in 218 syphilitic mothers it was delayed until after the fifth month. In the discussion that follows immediately the amount of treatment is not considered, emphasis being placed on the time of beginning treatment. Of the total number of women who began treatment before the fifth month, 78.4 per cent bore living, apparently nonsyphilitic children, in contrast with 60.6 per cent in which treatment was begun after the fifth month of pregnancy. There were also more than three times (23.4 per cent) as many syphilitic children born in the group in which treatment was begun after the fifth month as in those beginning treatment early (6.6 per cent). If, in addition to beginning treatment early in pregnancy, adequate treatment is given in the form of at least ten or preferably fifteen injections of an arsenical and appropriate heavy metal, the effect on the outcome of the syphilitic pregnancy is even more favorable. In such cases 91 per cent of the women were delivered of living, apparently nonsyphilitic children. Even with less than ten injections of an arsenical and appropriate heavy metal when treatment was started before the fifth month of pregnancy, only 4.9 per cent of the mothers gave birth to syphilitic children, as compared with 20.7 per cent when this type

4. In a total of 4,581 arsenical injections given syphilitic women during pregnancy, the number of severe arsenical reactions per 1,000 injections was 0.87 with a probable error of 0.293, while among the 35,066 arsenical injections given the syphilitic women never pregnant since their infection, the number of severe arsenical reactions per 1,000 was 3.08 with a probable error of 0.139. The difference in the rate of arsenical reactions for these two groups of syphilitic women is more than 6 times its probable error. $(2.21 \pm 0.334.)$

5. It should be routine practice to take a serologic test for syphilis as soon as a diagnosis of pregnancy is made, and, if negative, further tests as late as the seventh month, in order to detect an incipient syphilis. A beginning syphilitic infection in the pregnant female may otherwise be undetected.

of treatment was begun after the fifth month of pregnancy. Morever, in the group of syphilitic mothers who were given at least ten injections of an arsenical but less than ten injections of a heavy metal early in their pregnancy, only 5.1 per cent bore syphilitic children, as compared with 40.0 per cent when similar treatment was begun later. The best results, therefore, are obtained by giving the syphilitic woman adequate treatment in the form of at least ten but preferably fifteen arsenical injections and appropriate heavy metal early in pregnancy.

VALUE OF INADEQUATE TREATMENT EVEN LATE IN PREGNANCY

If a patient appears late in pregnancy, will some treatment, even though only a little, started at this period, have a protective influence on the unborn child? Further, is the stage of the disease at the time of admission of the syphilitic woman a determining factor in the transmission of syphilis?

In this series of cases there were sixty-eight women with early syphilis who had received no treatment during pregnancy, and of these 34 per cent were delivered of a living, apparently nonsyphilitic child. Among sixty-six women with early syphilis who had received some treatment late in pregnancy, 49 per cent were delivered of a living, apparently nonsyphilitic child. Among those women with early syphilis there was a complete loss of fetal life in terms of miscarriage, abortion or stillbirth in 46 per cent of the pregnancies when no treatment was given; this dropped to 7.6 per cent when some treatment was given in the late period of pregnancy. The fact that the mother's syphilis had reached the late or latent stage before conception did not alter the necessity for protecting the child through treatment given late in pregnancy. Of seventy-seven women who were admitted with late or latent syphilis and had received no treatment during pregnancy, 47 per cent bore living, apparently nonsyphilitic children, as compared with 66 per cent of the 152 mothers who had received some treatment after the fifth month of pregnancy. Among the late and latent syphilitic women who were untreated during pregnancy, 40 per cent of the children were born dead as compared with only 12 per cent among those women in the same stage of syphilis who had been given some treatment after the fifth month.

These data indicate that, even though the syphilis is discovered late in the pregnancy, treatment from this period up to the termination of the pregnancy results in from three to six times as many living children, depending on the stage of the mother's syphilis.

TREATMENT IN PRECEDING PREGNANCY FAILS TO INFLUENCE OUTCOME OF SUBSEQUENT PREGNANCY

The problem has also been investigated from still another angle by evaluating treatment in 138 syphilitic women who had had one or more preceding pregnancies and who had also a negative serologic reaction at the beginning of or during the pregnancy under consideration. These women were divided into two groups, those who were treated in the present pregnancy and untreated in the previous one, and those who were treated in both the present and the previous pregnancy. The result of the present pregnancy in the two groups of syphilitic mothers with a negative blood reaction indicated that it was the treatment during the present pregnancy that influenced the outcome. Whether treated or not during the preceding pregnancy, the mothers with a negative blood Wassermann reaction who received treatment during the present pregnancy had 75 per cent of living, apparently nonsyphilitic infants.

Gammeltoft[6] of Copenhagen and others also have investigated this problem and found that the syphilitic mother may be delivered of a syphilitic child many years after the infection. In a pregnancy the risks of infection to the child may be regarded as comparable to those risks of infection transmitted by blood transfusion. It is well known that a syphilitic individual who is no longer capable of transmitting the disease even through sexual contact may, as a donor in a transfusion, give the disease to another. While in such cases the disease is more or less latent in character and a physical examination or serologic test may show nothing, occasionally there may be a few spirochetes in the blood stream. Likewise the pregnant woman may transmit the infection through the placenta to her unborn child long after she has become innocuous to her sex partner.

In the Cooperative Clinical Group material there were a few instances of syphilitic children born as late as ten to eleven years after the mother's infection. In a group of syphilitic mothers who began treatment of their disease in its early stage, the longest time after infection that the disease was transmitted in utero was from eight to nine years (in the case of one child). This mother had been inadequately treated. It is worthy of mention that in women pregnant from one to three years after the infection there were no syphilitic children born to the mothers who had had adequate treatment. The safer procedure then for every mother who has or ever has had syphilis is to take antisyphilitic treatment throughout each pregnancy. This is believed to be true even though the fifty-two syphilitic mothers in this study who became pregnant after having been considered "cured" had no syphilitic children among those born up to fifteen years after infection.

RELAPSE OR PROGRESSION OF SYPHILIS IN ITS RELATION TO PREGNANCY AND STAGE OF INFECTION

The Cooperative Clinical Group studied 2,628 syphilitic women, pregnant and nonpregnant since the infection, in whom a comparison of relapse or progression of the disease could be made. Minimal effective treatment of syphilitic infection has been defined by the Cooperative Clinical Group as at least twenty injections of an arsenical with a like amount of heavy metal. Such a group of adequately treated women who became pregnant after the infection showed clinical progression or relapse of the disease in 4.1 per cent of the cases. Those women who had not experienced pregnancy after the infection had 7.1 per cent clinical progression or relapse. With inadequate treatment the respective percentages were 10.7 and 17.9. However, a study of the succeeding paragraphs shows that apparently it is the stage at which the syphilitic woman begins treatment and the amount of therapy administered rather than the pregnancy that most influences her further clinical progression or relapse.

Among the nonpregnant women who were adequately treated in the early stages of syphilis, about one half of the clinical progressions or relapses were of the central nervous system, while not a single progression of this type was seen in a similar group of patients who became pregnant after the infection. However, except for the possible protection pregnancy may afford from

6. Gammeltoft, S. A.: Syphilis and Pregnancy, Am. J. Obst. & Gynec. 15:747 (June) 1928.

V 106 1936

invasion of the central nervous system during early syphilis, the adequacy of early treatment is the principal factor in the prevention of progression and relapse. The pregnant woman who is adequately treated during early syphilis has four times as great a chance of avoiding clinical progression or relapse as one inadequately treated.

In the adequately treated woman with latent syphilis it was apparent that pregnancy offered the patient some protection against the development of clinical progression or relapse of syphilis (from 0.7 to 5.4 per cent). However, this protection was insufficient to manifest itself in the absence of an adequate amount of therapy. This study does not permit one to speak in definite terms as to the part which pregnancy plays in the control of late syphilis. The data indicate that in patients admitted with late syphilis who had experienced a pregnancy since the infection there was a slightly higher percentage of progression and relapse than in those who had not been pregnant since infection. However, it is quite possible that in those patients the syphilitic infection may have been so well established that the minor inhibitive influence of pregnancy was not recognizable or was lost among the unavoidable changes of the progressive process. It is planned in a forthcoming paper to study more completely the factors that influence progression and relapse in the patient with late syphilis.

SUMMARY AND CONCLUSIONS

1. The data show that congenital syphilis is practically a preventable disease. Its prevention is dependent on the routine, early and repeated use of the serologic blood test on every pregnant woman and on adequate early treatment once the diagnosis of syphilis has been made.

2. A positive blood test during pregnancy is a serious matter to the fetus. Ten times as many syphilitic children were born when the syphilitic mother's blood was positive during pregnancy as when it was negative.

3. The pregnant syphilitic woman was found to tolerate antisyphilitic treatment as well as or better than the syphilitic woman who had not been pregnant since infection.

4. There is evidence that habitually aborting syphilitic women are capable of producing living, apparently nonsyphilitic children when given specific treatment throughout each pregnancy.

5. Many more nonsyphilitic living children were born when antisyphilitic treatment was begun before the fifth month of pregnancy than when therapy was delayed. This advantage was increased if the treatment during pregnancy was not only early but adequate; that is, at least ten, preferably fifteen injections of arsphenamine and appropriate heavy metal.

6. If an early syphilis appears late in pregnancy, some treatment begun at this period and continued up to termination of pregnancy, even though it is only a small amount, will be of value in the production of a living child. To those women with early syphilis who were treated after the fifth month of pregnancy only 7.6 per cent of the children were born dead, whereas among a similar group of women with early syphilis to whom no treatment was administered during pregnancy the loss of life was 46 per cent.

7. Treatment during a preceding pregnancy is insufficient protection for the present pregnancy, even though the syphilitic woman has a negative blood reaction. It is necessary to treat her throughout each pregnancy to insure a living nonsyphilitic infant.

8. The important factors in controlling clinical progression and relapse in the syphilitic woman are the stage of syphilis on beginning treatment and the amount of therapy administered, rather than the pregnancy. The possible exception is the apparent protection pregnancy affords the patient with early syphilis in avoiding an involvement of the central nervous system.

Committee on Foods

ACCEPTED FOODS

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

PEVELY EVAPORATED DAIRY MILK
(ADDED COD LIVER OIL CONCENTRATE)

Manufacturer.—Pevely Dairy Company, St. Louis.

Description.—Evaporated milk containing 28 U. S. P. vitamin D units (vitamin D concentrate prepared from cod liver oil) per ounce (31 per fluidounce).

Manufacture.—A definite quantity of cod liver oil concentrate (Vitex, Vitex Laboratories, Inc.) is introduced into evaporated milk prepared by the standard procedure (THE JOURNAL, April 16, 1932, p. 1376) as the milk leaves the evaporating pans. The mixture is homogenized, cooled and thoroughly sterilized by the usual methods.

Claims of Manufacturer.—Antirachitic when used to provide all milk needs of the normal infant.

CELLU PRUNE PLUMS PACKED IN WATER WITHOUT ADDED SUGAR OR SALT

Distributor.—The Chicago Dietetic Supply House, Inc., Chicago.

Packer.—Hunt Brothers Packing Company, San Francisco.

Description.—Canned cooked prune plums packed in water without added sugar or salt.

Manufacture.—Ripe plums are spray washed (defective fruit is removed), graded, again spray washed, placed in cans and covered with water. The treatment thereafter is essentially the same as for Cellu Blackberries Packed in Water Without Added Sugar or Salt (THE JOURNAL, Sept. 28, 1935, p. 1039).

Analysis (submitted by distributor).—

	per cent
Stones of plums	6.5
Stone of plums and liquid	3.8
	Edible portion
Moisture	89.4
Total solids	10.6
Ash	0.3
Fat (ether extract)	0.1
Protein (N × 6.25)	0.5
Reducing sugars as invert sugar	7.4
Sucrose	0.1
Crude fiber	0.2
Carbohydrates other than crude fiber (by difference)	9.5

Calories.—0.4 per gram; 11 per ounce.

Claims of Distributor.—For diets in which sweetened fruit is proscribed.

THAMES VALLEY UNSWEETENED EVAPORATED MILK

Distributor.—The Yantic Grain & Products Company, Norwich, Conn.

Packer.—Land O'Lakes Creameries, Inc., Minneapolis.

Description.—Canned, unsweetened, evaporated milk, the same as Land O'Lakes Unsweetened Evaporated Milk (THE JOURNAL, July 28, 1934, p. 260).

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street - - - Chicago, Ill.

Cable Address - - - - "Medic, Chicago"

Subscription price - - - - - Seven dollars per annum in advance

Please send in promptly notice of change of address, giving both old and new; always state whether the change is temporary or permanent. Such notice should mention all journals received from this office. Important information regarding contributions will be found on second advertising page following reading matter.

SATURDAY, FEBRUARY 8, 1936

DEFINITION AND ETIOLOGY OF ECZEMA

The definition of eczema given in a recent dictionary is "An inflammatory skin disease with vesiculation, infiltration, watery discharge, and the development of scales and crusts. The lesions vary much in character, and the disease is frequently attended with restlessness and fever and other constitutional disturbance, as well as by local itching and burning." The present controversy as to the origin and nature of eczema is thus, as it should be in a dictionary, neatly side stepped. The legitimate difference of opinion as to what eczema includes has been illustrated in a recent issue of the *British Journal of Dermatology and Syphilis*.

Adamson [1] believes that there is a distinct type of eruption for which the name "eczema" should be reserved as distinguished from "dermatitis." It consists of circumscribed areas which are red, raised and studded with weeping points, or with small dome-shaped crusts which may easily be mistaken for small papules unless closely inspected. If found early it appears as a cluster of pinhead-sized vesicles on a red and slightly raised base. The vesicles are easily broken by friction or scratching, and the more usual appearance of weeping points of small grouped crusts is then produced. This lesion results from an edematous swelling of the whole thickness of the cellular epidermis itself. The minute vesicles, weeping points or crusts are small intradermically formed pools of serum which have come up to the surface and are quite distinct. Adamson believes, from the larger superficially formed vesicles and blister-like bullae of a dermatitis. When the history can be traced back to the beginning, the condition is found to have started at one particular area as the result of the application of some local irritant. It may afterward be limited to this site or it may subsequently appear in distant parts, the skin having become everywhere hypersensitive to external irritants as a sequel to the primary eczematization. Adamson has never been convinced that internal derangements have any part in the causation of eczema.

With this view of the narrow limits of true eczema, Ingram [2] is unable to agree, although including the condition described as one form of the disorder. He believes that there is a clear and precise character about the eczematous reaction, manifest in the course of its development, no matter what the end result may be. The histologic picture of the reaction is distinct and always capable of reproduction. This character depends on the fact that the reaction emanates essentially from the capillary loops of the papillae and that the papillae and their capillaries are structures of uniform size. In the mildest form of capillary dilatation it is seen as a punctate erythema. The exudation of fluid occurs into and about the papilla as a humping of the epidermis—a pinhead-sized papule and the traveling of that exudation to the surface as a vesicle of like size. Finally the discharge, through an "eczema well," a pinhead-sized puncture of the epidermis, leads to the papillary fount of the reaction.

In other words, the reaction from the clinical point of view is a uniform pinhead-sized eruption, and that, in Ingram's opinion, should be the definition of eczema. If to the description is added the characteristic element of itching, the definition seems adequate and absolute.

There are two essential features in etiology common to all cases of eczema, Ingram believes. These are a background of physiologic hypersensitiveness or instability in the skin and a provocative external agent. That eczema is always dependent on a physiologically sensitive skin is obvious, because it is always provoked by an irritation that will not provoke the skins of normal persons. Furthermore, evidences of such physiologic instability are always forthcoming on examination of patients with eczema if examined as a whole. It may in fact be brought into evidence at such phases as puberty, the menopause or temporary depressions of health from influenza, pregnancy, confinement or shock. There must also be, however, some external provocation of one kind or another. This is, of course, well known; but one other factor, autosensitization, cannot be overlooked. It is certain that some patients readily develop specific sensitiveness to the altered serum of their own exudates whether they reach the surface or not. If shed on the surface it will act as a further external provocative cause of eruption; if reabsorbed into the blood stream it may determine sensitiveness in distant parts.

The views expressed in these two papers regarding the definition and etiology of eczema furnish good evidence of the still divergent views of this disorder. Most physicians probably still use the term in a loose way. Pending closer agreement among authorities they would do well to limit the application of the term eczema to one or the other of the conditions described.

1. Adamson, H. G.: Eczema, Its Definition and Its Etiology, Brit. J. Dermat. & Syph. 47:497 (Dec.) 1935.

2. Ingram, J. T.: Definition and Etiology of Eczema, Brit. J. Dermat. & Syph. 47:502 (Dec.) 1935.

V 106
1936

URINARY CALCULI IN BONE DISEASES

The possibility of an etiologic relationship between chronic bone disease and the formation of urinary calculi was first suggested more than a hundred years ago.[1] At that time it was noted that the injury of vertebrae may be followed by the formation of renal calculi. Since then a number of cases have been recorded in which formation of urinary calculi has occurred subsequent to injuries or to diseases of various bones. The period following the World War developed reports of this type presumably because of the increased incidence of bone injury and disease from gunshot wounds and amputations. Recently [2] the literature on the subject has been reviewed and fourteen additional cases have been described. Urinary calculi were found in patients with such varied bone diseases or conditions as osteomyelitis, fractures of long bones, fractures of the pelvis, amputations of the extremities, tuberculosis of the hip joints, arthritis deformans associated with osteitis deformans, and scoliosis. In all cases of urinary lithiasis, information concerning previous bone injury or disease should be sought and carefully considered from an etiologic point of view. The association between the two conditions appears to be more than accidental.

Several hypotheses have been advanced to explain this phenomenon. One investigator [3] has stressed the rôle of prolonged immobilization for fractures and wounds, especially in chronic suppurating lesions involving the bones, and subsequent infection of the urinary tract. The bacteria promote the decomposition of certain constituents of the urine, thus producing an alkaline reaction, which, as is well known, results in the precipitation of calcium salts. Another authority [4] emphasizes the importance of disturbances in the metabolism of calcium and phosphorus. It is pointed out that the appearance of urinary calculi in some cases of rickets, osteitis deformans, osteomalacia, osteitis fibrosa of von Recklinghausen, and osteitis fibrosa cystica associated with hyperparathyroidism appears to be dependent on a disturbance of the normal relationship between calcium and phosphorus. The increase in urinary calcium observed in hyperparathyroidism, for example, may lead to a change in the colloid-crystalloid equilibrium of the urine and thus favor the precipitation of certain urinary constituents. Possibly both the foregoing factors may be involved; indeed, the same general factors that apparently control the normal calcification of bone, namely, local hydrogen ion concentration, carbon dioxide tension and perhaps the enzyme phosphatase, are also fundamentally concerned in the deposition of calcium in the form of urinary calculi.

This interesting conception of the etiology of urinary calculi in chronic bone diseases is obviously of importance in pointing the way to a logical type of therapy. The control of the bone disease or injury is, of course, of primary importance. However, careful attention should be directed also to the diet of the patient. The dietary should supply sufficient amounts of calcium and phosphorus in the proper ratio for most efficient physiologic utilization.

1. Costello, W. B.: Case of Stone in the Bladder from Injury to the Loins, Lancet **2**: 109, 1832.
2. Goldstein, A. E., and Abeshouse, B. S.: Urinary Calculi in Bone Diseases, Arch. Surg. **31**: 943 (Dec.) 1935.
3. Eisenstaedt, J. S.: Certain Tangible Factors in the Etiology of Urinary Calculus, Tr. Chicago Urol. Soc. **1**: 65, 1931.
4. Squier, J. B.: Calculous Disease of the Kidneys and Ureters, in Lewis's Practice of Surgery, Hagerstown, Md., W. F. Prior Company, Inc., 1931, chapter 10.

BLOOD SUGAR AND LACTOSE IN MILK

Milk is a true secretion; it is the product of synthesis by the secreting epithelium of the mammary gland. Casein, lactose and milk fat are the characteristic chemical compounds produced by this activity, and they are made from the raw materials presented in the blood. According to current views, milk protein is produced from the amino acids of the blood; milk fat arises from blood lipids, which in turn originate either in the fats or in the carbohydrates in the food; and lactose is synthesized from the dextrose of the blood. Because of the great biologic and economic significance of lactation as well as the ready accessibility of the related structures for experimental study, much evidence is available on this phase of the reproductive cycle. One feature of lactation is the essential invariability of the composition of milk. The quantity of milk produced can be changed in various ways, but only to a relatively insignificant extent can the quality be altered. This uniformity of the composition of milk is emphasized again in a recent contribution by Tolstoi.[1]

The studies were carried out on lactating diabetic patients about two weeks post partum. Five subjects were given 100 Gm. of dextrose by mouth before breakfast, and samples of blood and of breast milk were obtained after one-half, one, two and three hours In every instance there occurred a sharp increase in the concentration of dextrose in the blood. On the other hand, the level of lactose in the milk remained at a strikingly uniform level throughout the experimental period. In four other cases insulin was given and the lactose determined in the milk when the blood sugar had reached a low level. Again there was little if any variation in the concentration of lactose in the milk.

The extent to which the existing abnormality of metabolism in the subjects employed influenced the results is difficult to estimate. The second series with insulin seems to represent a condition of essentially normal metabolism. Nevertheless, the studies offer evidence for an effective and characteristic activity on the part of the mammary gland as far as the maintenance of a uniformity in composition of the milk is concerned. Milk production is a severe drain on the organism; ordinarily there appears to be a prompt but transient

1. Tolstoi, Edward: J. Clin. Investigation **14**: 863 (Nov.) 1935.

hyperglycemia after birth of the young,[2] and parathyroid activity is said to be stimulated, thus providing in part for the mobilization of calcium.[3] These are compensatory devices for the unusual loss of material by way of the mammary secretion and illustrate the extent to which the body makes adjustments in order to insure an optimal food for the early nutrition of the young.

Current Comment

LIP STICK DERMATITIS

From time to time attention has been directed in these columns to the fact that the contact of certain substances with the skin may ultimately produce sensitization followed by definite symptoms of dermatitis.[1] The list of offending agents has now assumed considerable length. In addition to certain rubber bases in adhesive plaster, such substances as butesin picrate, lip stick, lip rouge, perfumes, leather hat bands, dyes from toilet seats, and solvents from shoe dyes have been reported as etiologic agents in contact dermatitis. Recently [2] another case of lip stick dermatitis has been described and an attempt was made to determine the identity of the causative agent. The patient was sensitive to two shades of lip stick of a certain brand but showed no reaction to other kinds tested. In general, lip sticks may contain the following substances: white wax, hydrogenated oil, theobroma oil, castor oil, hydrous wool fat, white petrolatum, fluorescein derivatives, preservative, coloring matter and perfume. Patch tests on the arm were made on the patient and on normal control subjects to detect sensitivity to the individual ingredients of the lip stick. The oleaginous base and a number of commonly used aniline dyes gave negative results. The application of the perfume, however, either alone or with the other ingredients, produced a reaction consisting of a vesicular and erythematous patch, thus indicating that the perfume was the cause of the dermatitis. Further tests were made in which the various possible components of the perfume were used, including ambergris, civet, castor, musk, iris concrete, alpha ionone, methyl ionone, rose Bulgarian, methyl heptine carbonate, and synthetic violet flowers. The patient showed a marked reaction to the methyl heptine carbonate, as did nineteen of the thirty-eight control women. In all cases negative responses were obtained with the other ingredients tested, with the exception of mild erythematous reactions to castor and to musk in two of the control subjects. Thus it appears that the presence of methyl heptine carbonate in the perfume of the lip stick produced the dermatitis in the patient in question. Undesirable reactions of the foregoing type emphasize the urgent need for careful experimental study by the manufacturer to detect possible deleterious effects of the ingredients of proprietary preparations to be applied to the skin, before such substances are released for general use.

2. Meigs, E. B.: Physiol. Rev. **2**: 204 (April) 1922.
3. Hart, E. B.: Nutrition and Milk Production, J. A. M. A. **99**: 582 (July 9) 1932.

1. Skin Irritants in Adhesive Plaster, J. A. M. A. **105**: 603 (Aug. 24) 1935.
2. Baer, H. L.: Lip Stick Dermatitis, Arch. Dermat. & Syph. **32**: 726 (Nov.) 1935.

CARBON DIOXIDE IN PRESERVATION OF FISH

The important position of fish and fish products in the diet has been emphasized in recent years by the observation that fish oils are potent sources of vitamins A and D, the fat soluble food accessories. One of the problems in the fish industry is concerned with the deterioration of the flesh before the catch can be brought into port and adequately treated. Frequently it is several days from the time the fish are landed until their disposal. Fish is one of the most perishable of all foodstuffs. Therefore, any improvement in methods of preventing deterioration is of physiologic and economic importance. Interesting progress in preserving fresh fish has recently been achieved by the use of carbon dioxide. The United States Bureau of Fisheries has conducted a study [1] of the feasibility of using carbon dioxide in the handling and transportation of fresh fish under commercial conditions obtaining in the United States. The investigation was restricted to one species, the haddock, this being fairly representative of nonfatty fish and being caught in larger quantities in this country than any other species of the type. The authors were particularly interested in determining the value of carbon dioxide during the relatively short time between the landing and the consumption of the catch. In each series of experiments the fish were divided into two lots; one was designated as the control and was packed in ice without carbon dioxide, and the other was stored with both ice and gas. At intervals the fish or the fillets were withdrawn from each group and subjected to chemical tests and bacterial counts. Beginning about the third day after storage, the haddock stored in carbon dioxide were noticeably in better condition than those packed in ice alone. In a week or more the difference was decidedly evident. This beneficial effect of the gas was manifested only when used with haddock just passing out of rigor mortis; fish in rigor mortis were not greatly benefited by carbon dioxide storage as long as rigor persisted. As no rise in bacterial count on decomposition occurs until after rigor mortis has passed, it is not to be expected that an atmosphere of carbon dioxide, which retards decomposition by reducing bacterial growth and action, would be of any definite value as long as the fish remains in rigor mortis. Studies conducted on fillets indicated that these specially prepared fish can also be greatly benefited if carbon dioxide is used in their storage. The obvious value of methods designed to perpetuate the freshness of fish adds significance to this government research project and should lead to attempts to preserve fish not only after landing but also on board fishing vessels. This problem has particularly great economic and public health significance in fishing regions, in which often a week may elapse between the time the fish are caught and the time they are landed by the fishing vessel.

1. Stansby, M. E., and Griffiths, F. P.: Indust. & Engin. Chem. **27**: 1452 (Dec.) 1935.

V 10
1936

Association News

RADIO BROADCASTS

The American Medical Association broadcasts over WEAF, the Red network instead of the Blue, as formerly, and certain additional stations of the National Broadcasting Company at 5 p. m. eastern standard time (4 o'clock central standard time, 3 o'clock mountain time, 2 o'clock Pacific time) each Tuesday, presenting a dramatized program with incidental music under the general theme of "Medical Emergencies and How They Are Met." The title of the program is "Your Health." The program is recognizable by a musical salutation through which the voice of the announcer offers the toast "Ladies and gentlemen, your health!" The theme of the program is repeated each week in the opening announcement, which informs the listener that the same medical knowledge and the same doctors that are mobilized for the meeting of grave medical emergencies are available in every community, day and night, for the promotion of the health of the people. Each program will include a brief talk dealing with the central theme of the individual broadcast.

Red Network.—The stations on the Red network of the National Broadcasting Company are WEAF, WEEI, WTIC, WJAR, WTAG, WCSH, KYW, WFBR, WRC, WGY, WBEN, WCAE, WTAM, WWJ, WMAQ, KSD, WHO, WOW, WDAF.

Pacific Network.—The stations on the Pacific network are KGO, KPO, KFI, KGW, KOMO, KHQ, KFSD, KTAR.

The next three programs are as follows:

February 11. Little Tips on Home Hygiene, W. W. Bauer, M.D.
February 18. Heart Disease, Morris Fishbein, M.D.
February 25. Crippled Children, W. W. Bauer, M.D.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ARIZONA

Society News.—Dr. Alvy N. Crain, Phoenix, was chosen president of the Arizona Public Health Association at its recent annual meeting.

Tuberculosis Preventorium in the Desert.—A school for children who are predisposed to tuberculosis has been opened in an abandoned Civilian Conservation Corps camp in the desert fifteen miles from Tucson. The school has been financed with WPA funds, the New York *Times* reported, January 20, and within thirty days will be caring for 150 boys and 212 girls, it is expected. Outdoor exercise, proper diet, rest and health supervision will be combined with school studies. A large proportion of the children are from families of war veterans, it was stated.

COLORADO

Veteran Practitioners Honored.—Life memberships on the medical staff of Beth-El Hospital, Colorado Springs, were given to Drs. Charles F. Gardiner, John H. Hereford, James H. Madden and Henry M. Ogilbee, January 14, at the annual meeting of the staff, in appreciation of their services to the community and to their profession. All the physicians have completed fifty years in the practice of medicine.

DELAWARE

State Journal Copyrighted.—Beginning with the January issue, the *Delaware State Medical Journal* will be copyrighted to prevent misuse or misquotation of its contents.

Academy Meetings.—Dr. Leonard G. Rowntree, director of the Philadelphia Institute of Medical Research, addressed the Delaware Academy of Medicine in Wilmington, January 9, on the pineal and thymus glands with special reference to recent research. Dr. George W. Crile of Cleveland spoke before the academy February 7, and Dr. Emil Novak, associate professor of obstetrics, University of Maryland School of Medicine, Baltimore, will discuss physiology of the female sex cycle March 13.

DISTRICT OF COLUMBIA

Medical Bill in Congress.—*Bill Introduced:* H. R. 10717, introduced by Representative Randolph, West Virginia, proposes to direct the board of optometry to examine Welton B. Hutton for a limited license to practice optometry in the District of Columbia.

Lecturers on Public Health.—George Washington University School of Medicine has announced the addition to the faculty of the newly established course in public health teaching of Drs. George W. McCoy, Rolla E. Dyer, Edward Francis, Charles Armstrong and Robert Olesen, all of the U. S. Public Health Service, with the title of professorial lecturer in preventive medicine. The appointment of Ralph W. Barris, Ph.D., as assistant professor of anatomy at the school of medicine was also announced.

Personal.—Dr. John S. Arnold, for thirty-two years a member of the health department of the Medical Society of the District of Columbia, has retired from that position and has returned to private practice, it is reported.——Dr. Arthur C. Christie was reelected president of the board of trustees of American University recently.——Dr. Archibald Barklie Coulter has been appointed director of the bureau of tuberculosis of the health department of the district on a part time basis. Dr. Coulter was recently named tuberculosis coordinator of the district.

GEORGIA

Physician Honored.—Dr. Eugene E. Murphey, for twenty-five years a member of the board of health of Augusta, was named commissioner emeritus of the board at a meeting, January 10. Dr. Murphey graduated from the University of Georgia School of Medicine in 1898. He was president of the board of health and ex officio commissioner of health of Augusta from 1908 until 1933 with the exception of eighteen months in the army during the World War, when he was chief of the medical service at the base hospital, Camp Gordon. He has served as president of the State Medical Association of Georgia and of the Georgia Public Health Association. He is now president of the Augusta-Richmond Tuberculosis Association and professor of clinical medicine at his alma mater.

IDAHO

Society News.—Drs. Charles B. Ward and Paul G. Flothow, Seattle, addressed the South Side Medical Society recently in Twin Falls on "Practical Points in Treatment of Cancer" and "Recent Advances in Surgery of the Sympathetic Nervous System," respectively.

ILLINOIS

Clinic in City Hall.—As part of a recently established plan to provide indigents and low income families in Peoria with more adequate medical service,, newspapers report that the city hall has made available two rooms for the newly created Peoria Medical Clinic. Physicians of the city have agreed to give their services gratuitously through the clinic, which will be financed with appropriations from the Community Fund and county agencies. The Community Fund has stipulated that an executive committee of physicians and lay persons be established.

Society News.—Dr. Daniel H. Levinthal, Chicago, discussed "Treatment of Poliomyelitis in the Convalescent Stage" before the Bureau County Medical Society in Spring Valley, February 4; he also showed a motion picture on "Reconstruction Surgery for Residual Paralysis Following Poliomyelitis."—— Speakers before the Carroll County Medical Society, January 30, were Drs. John R. Harger and Clarence A. Neymann, Chicago, on "General Practitioner and the Acute Abdomen" and "Modern Concepts of the Classification of Nervous and Mental Diseases and Their Treatment" respectively.——At a meeting of the Christian County Medical Society, January 30, Drs. Garwood C. Richardson and William B. Serbin, Chicago, discussed recent advances in obstetrics and obstetric hemorrhages, respectively.—— Dr. William T. Coughlin, St. Louis, discussed "Cancer of the Breast" before the Macoupin and Montgomery county medical societies in January in Carlinville.

Chicago

Educational Campaign in Mental Hygiene.—The committee for mental hygiene of the Chicago Medical Society is arranging a special educational program on mental hygiene for lay persons. Radio talks, newspaper articles and addresses for parent-teacher meetings will be used, and arrangements have been made with Dr. Edward F. Dombrowski, managing officer of the Chicago State Hospital, to hold clinics for the branches of the Chicago Medical Society.

In Memory of Harry Eugene Kelly.—A resolution was adopted by the Chicago Medical Society, expressing regret in the death of Harry Eugene Kelly, for several years an attorney for the Chicago Medical Society. Mr. Kelly, who died January 14, was instrumental in constructing and having passed the Illinois medical practice act in 1923. He presented a paper entitled "Regulation of Physicians by Law" before the Congress on Medical Education and Hospitals of the American Medical Association in 1924.

Society News.—Speakers before the Chicago Society of Internal Medicine, January 27, were Drs. Edmund F. Foley, Robert W. Keeton, Duane Darling and Aaron B. Kendrick, Ph.D., on "Alterations in Serum Proteins as an Index of Liver Failure"; Drs. William A. Brams and Jacob S. Golden, "Clinical Significance of Venous Pressure," and Carl A. Dragstedt, "An Experimental Study of the Mechanism of Anaphylaxis."——A joint meeting of the Chicago Tuberculosis Society and the Chicago Roentgen Society, January 9, was addressed by Drs. Robert S. Berghoff and Hollis E. Potter on "Diagnostic Value of X-Rays in Diseases of the Chest" and "Importance of the Caseous Lesion in Tuberculosis," respectively.—— The Chicago Pathological Society was addressed, January 13, among others, by Dr. Harold R. Ostrander on "Multiple Heterogenous Primary Malignant Tumors in One Host: Hypernephroma of the Kidney and Carcinoma of the Prostate."

INDIANA

Society News.—The Carroll County Medical Society was addressed in Burlington, January 9, by Dr. John E. Owen, Indianapolis, on "Appendicitis in Children."——At a meeting of the Fort Wayne Medical Society, January 7, Drs. Harold D. Caylor and Allen A. C. Nickel, Bluffton, discussed hyperparathyroidism.——Dr. John H. Hare, Evansville, read a paper on the common types of insanity and their diagnosis before the Gibson County Medical Society in Princeton, January 13. ——At a meeting of the Putnam County Medical Society in Greencastle, January 14, Dr. Gerald W. Gustafson, Indianapolis, spoke on toxemias of pregnancy.—— The Kosciusko County Medical Society was addressed in Warsaw, January 14, by Dr. John R. Baum, Warsaw, on "Carbohydrate Metabolism."

MARYLAND

Report on Communicable Diseases.—Provisional figures released by the State of Maryland Department of Health reveal that there was less communicable disease in Maryland in 1935 than for several years. There were 39,171 such cases in 1935 as compared with 63,089 in 1934, 39,781 in 1933 and 42,652 in 1932. The decided increase in 1934 was attributed to the statewide occurrence of measles and to increases in the pneumonias. Poliomyelitis and meningitis caused major concern in the state in 1935 with totals, respectively, of 107 and 217 cases as compared with twenty-seven and fifteen in 1934. Increases were noted for syphilis, scarlet fever, typhoid and tuberculosis, while reductions were recorded for pneumonia, whooping cough, diphtheria, undulant fever and tularemia.

MASSACHUSETTS

Personal.—Dr. Karl V. Quinn, formerly assistant superintendent of the Belchertown State School, Belchertown, has been appointed assistant commissioner of mental diseases for Massachusetts. Dr. Quinn graduated from Queens University Faculty of Medicine in 1924. He has been at the Belchertown school since 1926.—— Dr. Barbara T. Ring, Arlington, was given an honorary life fellowship in the New England Society of Physical Therapy, recently, as a tribute to the late Dr. Arthur H. Ring and for their contributions to the activities of the society.——Drs. Isador H. Coriat and Abraham Myerson, Boston, have been inducted as members of the Jewish Academy of Arts and Sciences.——Dr. Edmund H. Stevens, Cambridge, observed his ninetieth birthday, January 2.

Sickness Among the Unemployed.—Unemployed persons as a group are not as healthy as the employed, according to a study of the entire population of Boston over a six months period, made by faculty members of Harvard University. The study is a part of a survey of unemployment conditions in Massachusetts conducted by various members of the Harvard faculty for the state department of public welfare. The unemployed have proportionately more illness than the part time or full time employed. But the group with the greatest proportion of sickness is the not-seeking-employment class, which includes the young, the housewives, the aged and the chronic sick. The unemployed have more serious illnesses than the employed and receive proportionately more medical care, free or paid, than any other group of the city's population. The temporary and part time employed have the largest number of cases with no medical care. The report further states that the unemployed form the majority of free outpatient and inpatient hospital cases. About one out of every two cases of illness in the city has paid medical care, about one of every three receives free treatment and one out of six has no outside medical treatment. Private physicians care for about half of the city's sick (48.1 per cent). Free private-physician cases (13.2 per cent) form only a small proportion of the total private-physician cases. About one out of every two cases of sickness is treated by a private physician and one out of three by hospitals. In making the survey, illness was considered as any sickness which incapacitates a person for at least two days. Figures were taken from the unemployment census survey for the state, made by the CWA, showing the illnesses of 769,504 persons in greater Boston during the last six months of 1933. In this group 68,047 sick persons reported 76,073 cases of illness for the entire period, averaging 1.1 case of illness per person. In 76,073 cases of illness no medical care whatever was received in 12,201, or 16 per cent.

MINNESOTA

Society News.—At a meeting of the East Central Minnesota Medical Society, recently, speakers were Drs. Everett C. Hartley, St. Paul, on "Clinical Observations on the Use of Endocrines in Obstetrics and Gynecology"; Everett K. Geer, St. Paul, "Diagnosis and Treatment of Asthma," and Robert G. Allison, Minneapolis, "Recent Developments in the Treatment of Malignancy by Deep X-Ray Therapy."——The Hennepin County Medical Society was addressed, January 29, by Drs. Benjamin J. Clawson, Minneapolis, and Ernest S. Mariette, Oak Terrace, on "Allergy and Resistance in Tuberculosis" and "Tuberculosis Problem Among Nurses in a Tuberculosis Sanatorium," respectively. February 3, Dr. Karl A. Menninger, Topeka, spoke on "Emotional Factor in Hypertension," and February 5, Dr. Russell L. Haden, Cleveland, on "Clinical Deficiency Disease."

County Officers' Conference.—The annual county officers' conference of the Minnesota State Medical Association will be held at the Lowry Hotel, St. Paul, February 29. Social security and the social security act will be the theme of the program. Speakers at the conference will include Dr. William W. Bauer, director, Bureau of Health and Public Instruction, American Medical Association, Chicago; Mr. Victor Christgau, WPA administrator for Minnesota, and Mr. B. E. Youngdahl, director of SERA; Dr. Monte C. Piper, Rochester; Mr. J. H. Baker, executive secretary, Hennepin County Medical Society; Dr. Ludwig L. Sogge, Windon; Dr. William F. Braasch, Rochester; Dr. Albert J. Chesley, state health officer; Dr. Theodore H. Sweetser, Minneapolis; Dr. Edward A. Meyerding, St. Paul, secretary of the state association, and Mr. R. R. Rosell, assistant to the secretary. Dr. William W. Will, Bertha, president of the state medical association, will preside at the noon luncheon and the afternoon sessions, and Dr. Meyerding will preside at the breakfast and morning sessions.

MISSISSIPPI

Regional Conferences.—A series of regional conferences for public health workers was held during December at the following centers: Aberdeen, December 2; Greenwood, December 6; Hattiesburg, December 10; Jackson, December 12. Speakers were Drs. Horton Casparis, professor of pediatrics, Vanderbilt University School of Medicine, Nashville; John A. Milne, Jackson, supervisor of field unit, state board of health, and Archie L. Gray, Jackson, of the epidemiologic unit.

MISSOURI

Dr. Allen Lectures.—Edgar Allen, Ph.D., professor of anatomy, Yale University School of Medicine, New Haven, gave the third annual Harry Hayward Charlton Memorial Lecture in Anatomy at the University of Missouri, January 6, on "The Escape of the Egg from the Ovary."

Society News.—The St. Louis Medical Society was addressed, January 21, by Dr. Thomas B. Pote on "Incidence of Trichina Spiralis" and Michael Somogyi, Ph.D., and Dr. Jerome E. Cook, "Practical and Theoretical Considerations in the Treatment of Diabetes."——The monthly clinic of the Kansas City Southwest Clinical Society, February 11, will be a symposium on pneumonia, presented by members of the society; the guest speaker will be Dr. Wheelan D. Sutliff, Chicago, who will give an outline of the serum treatment of pneumonia.——At a meeting of the Kansas City Pathological

V 10
1936

Society, January 21, speakers were Drs. Ferdinand C. Helwig on "Sarcoma of the Spleen" and Eugene R. Kellersberger, Bihanga, Belgian Congo, Africa, "Tropical Diseases in the Congo."

NEW JERSEY

Personal.—Dr. Ellsworth E. Conover, Hasbrouck Heights, was guest of honor at a banquet given by the Bergen County Medical Society in Hackensack, November 22, in observance of his fiftieth anniversary in the practice of medicine.—— Dr. William S. Collens, Brooklyn, has been appointed director of metabolic diseases at Aurora Health Institute at Morristown.

NEW YORK

Society News.—Speakers before the Medical Society of the County of Albany, January 29, were Drs. Charles Gordon Heyd and Frederic E. Sondern, New York, on "Malpractice Defense and Indemnity Insurance," and Walter A. Reynolds, "Hypertension in Children and Young Adults."

Graduate Course on Cancer.—The Medical Society of the County of Erie began a graduate course on cancer in Buffalo, February 2, which will continue on Sunday afternoons through April 5. Speakers announced are members of the staff of the State Institute for Study of Malignant Disease, as follows: Drs. Burton T. Simpson, Louis C. Kress, Charles C. Herger, Alphonse A. Thibaudeau, Ernest M. Watson, Walter L. Mattick, William H. Wehr, Walter T. Murphy and Joseph P. O'Brien; Eugene M. Burke and Melvin C. Reinhard, M.A.

Bills Introduced.—S. 503 proposes a system of compulsory and voluntary sickness insurance the benefits of which are to consist of cash and all forms of medical and dental service. Persons employed at "other than manual labor" and receiving wages in excess of $60 a week, farm laborers and persons employed by an employer having less than three employees in personal and domestic service are to be excluded from the compulsory insurance of the bill but are to be entitled to participate in the voluntary insurance. This bill appears to be the so-called Epstein Health Insurance Bill, proposed by the American Association for Social Security, Inc. A. 623 proposes that, as a condition precedent to the obtaining of a license to wed, both parties to a prospective marriage be required to present to the official authorized to issue such licenses a statement, signed by a licensed physician, that neither party is "infected with syphilis or in a state of that disease that may become communicable." The physician's statement must be accompanied by a record of a standard laboratory blood test made not more than forty days before the issuance of the marriage license. S. 586 proposes to authorize New York City to establish and maintain a public clinic or hospital within the area bounded by Eighth and Lexington avenues and One Hundredth and One Hundred and Twenty-Fifth streets, for the prevention and treatment of tropical and contagious diseases. The medical and nursing staffs of the proposed clinic or hospital must be composed of at least 50 per cent of doctors and nurses of the same racial origin as the majority of the inhabitants of such area. A. 550 proposes that no employee of any hospital be required or permitted to work more than eight hours in any day or more than forty-eight hours in any calendar week. Each employee is to be entitled to receive twenty-four consecutive hours of rest in any calendar week.

New York City

The Sir Robert Jones Lecture.—Dr. Frederick J. Gaenslen, Milwaukee, gave the sixth Sir Robert Jones Lecture at the Hospital for Joint Diseases, February 6, on "Fractures of the Neck of the Femur."

Hospital News.—A psychiatric clinic for children has recently been organized at the Babies' Hospital in cooperation with the College of Physicians and Surgeons of Columbia University under a grant from the Commonwealth Fund. Dr. William S. Langford is in charge.——Dr. Thomas A. Martin has resigned as medical director of Harlem Hospital to become medical director of St. Vincent's Hospital. Dr. Oswald N. LaRotonda succeeded Dr. Martin at Harlem.

Society News.—Drs. Daniel F. Jones, Boston, and Carl Eggers addressed a stated meeting of the New York Academy of Medicine, February 6, on "The More Recent Advances in the Treatment of Carcinoma of the Sigmoid and Rectum" and "Diverticulitis of the Colon," respectively.——A program on heart disease will be presented at a meeting of the Medical Society of the County of Queens, February 25, with the following speakers: Drs. Charles C. Wolferth, Philadelphia, on "Present Status of Electrocardiography in the Study of Coronary Arteriosclerosis and Its Complications"; Irving R. Roth, "Prognosis of Various Types of Heart Disease," and Daniel Porte, "Newer Methods of Treatment of Heart Disease."

OHIO

Scholarship Open at Ohio State University.—Announcement is made of the Elizabeth Clay Howald Scholarship of $3,000 for study at Ohio State University, Columbus. Any person who has in progress work that promises to yield important contributions to knowledge is eligible for the scholarship. If the appointee has ever been a student at Ohio State University or a member of its staff he may carry on his investigations either at the university or in another place where superior advantages for his field are available. If he has had no connection with the university, he must do his work there. Applications must be filed with the dean of the graduate school not later than March 1. Blanks may be obtained from the dean. The appointment will be made April 1 and the term of appointment will begin July 1. The honorarium will be paid in twelve monthly instalments.

PENNSYLVANIA

New Members of State Board.—Governor Earle has recently announced the following changes in the State Board of Medical Education and Licensure: Dr. William Cullen Bryant, Pittsburgh, to succeed Dr. Harry W. Albertson, Scranton; Dr. George W. Hartman, Harrisburg, to succeed the late Dr. Clarence Bartlett, Philadelphia, and Dr. Domer S. Newill, Connellsville, to succeed Dr. Charles J. Hemminger, Somerset.

Philadelphia

The Annual Thomas Oration.—Dr. Clyde Leroy Deming, clinical professor of urology, Yale University School of Medicine, New Haven, Conn., delivered the B. A. Thomas Annual Oration of the Philadelphia Urological Society, January 27, on "The Gonadotropic Factor as an Aid to the Surgical Treatment of Undescended Testicle."

Public Lectures by Dr. Novak.—A series of three lectures by Dr. Emil Novak, associate professor of obstetrics, University of Maryland School of Medicine, Baltimore, in a medical forum open to the public was begun January 31. The general subject is "The Woman Asks the Doctor." Future lectures will be March 13 and April 13, in the auditorium of the Philadelphia County Medical Society.

University News.—Temple University recently celebrated the tenth anniversary of the presidency of Charles E. Beury, LL.D. Developments during the decade included the building of a new home for the school of medicine in 1929. In the ten years the number of beds of Temple University Hospital have increased from 266 to 462, house patients from 4,974 to 9,360, dispensary patients from 33,536 to 116,344, operations from 2,511 to 6,729, and annual free service from $71,250.10 to $358,221.45. At a dinner, January 18, Dr. Wilmer Krusen, honorary vice president of the university, presided; addresses were made by Dr. Beury, William Mather Lewis, Litt.D., president of Lafayette College, Easton, and Mrs. Curtis Bok.

Pittsburgh

Society News.—Dr. Howard G. Schleiter, among others, addressed the Pittsburgh Academy of Medicine, January 14, on "Cardiac Complaints and Lesions Following Nonpenetrating Wounds of the Chest."——Dr. David L. Simon addressed the Pittsburgh Urological Association, January 20, on "Anomalies of the Kidney."——At the annual dinner of the Pittsburgh Medical Forum, January 20, the guest speaker was Dr. Aaron S. Blumgarten, New York, on "New Concepts in Endocrine Diagnosis and Treatment."

Hospital News.—Dr. Harold W. Jacox, assistant professor of roentgenology, University of Michigan Medical School, Ann Arbor, has been appointed director of roentgen and radium therapy at the Western Pennsylvania Hospital, to succeed the late Dr. Heinz Langer. Dr. Jacox was graduated from the University of Michigan in 1928.——Montefiore Hospital opened special rooms for oxygen therapy and air-conditioned rooms for treatment of hay fever, asthma and dermatologic conditions, January 20. Dr. Alvan L. Barach, New York, made an address on "Development of the Use of the Gases of the Air in the Treatment of Cardiorespiratory Disease" and J. I. Banash, consulting engineer, Chicago, on "The Doctor, Oxygen and the Engineer."

RHODE ISLAND

Bill Introduced.—H. 597 proposes a system of compulsory and voluntary sickness insurance the benefits of which are to consist of cash and all forms of medical and dental service. Persons employed at "other than manual labor" and receiving wages in excess of $60 a week, farm laborers and persons employed by an employer having less than three employees in

personal and domestic service are to be excluded from the compulsory insurance of the bill but are to be entitled to participate in the voluntary insurance. This bill appears to be the so-called Epstein Health Insurance Bill, proposed by the American Association for Social Security, Inc.

SOUTH CAROLINA

Bill Introduced.—H. 940 proposes to create the Cherokee County Hospital Board, which is to be authorized to purchase the existing city hospital at Gaffney or to construct and equip a hospital in Cherokee county suitable to the needs of the county. This board is to have charge and control of the maintenance of the hospital thus purchased or constructed.

Society News.—Dr. James W. Jervey Jr., Greenville, addressed the Oconee County Medical Society at Seneca in December on infections of the upper respiratory tract.——Drs. Edward W. Barron and Thomas D. Dotterer, Columbia, discussed care of the new-born and infant feeding, respectively, at a meeting of the Edisto Medical Society in December.

VIRGINIA

Bills Introduced.—S. 119 proposes to require the annual licensing by the Board of Pharmacy of persons engaged in the manufacture or preparation of drugs, medicines, toilet articles, dentifrices or cosmetics and to require such manufacturing and preparation to be under the supervision of a registered pharmacist or some other person approved by the Board of Pharmacy. S. 121 proposes to make it unlawful to distribute any drug, medicine or pharmaceutical or medicinal preparation by means of so-called "medicine shows" or "patent medicine shows." H. 163, to amend the dental practice act, proposes to prohibit any person who has appealed to the courts from an order of the Board of Dental Examiners revoking or suspending his license to practice dentistry from practicing dentistry until such time as the court reverses the order of the board.

WASHINGTON

Surgical Meeting.—Dr. Owen H. Wangensteen, Minneapolis, was the principal speaker at a session of the Spokane Surgical Society at the Davenport Hotel, February 8, in Spokane. He discussed "Diagnostic and Therapeutic Considerations in the Management of Acute Abdominal Disorders" and "Practical Considerations in the Management of Acute and Chronic Empyema." He also conducted a clinic. In addition to papers presented by members of the society, a round table luncheon was held at which the theme was "Practical Aspects of the Therapeutic Problem in Bowel Obstruction."

GENERAL

Conference on Psychiatric Education.—The division of psychiatric education of the National Committee for Mental Hygiene is sponsoring a conference at the Henry Phipps Psychiatric Clinic, Baltimore, April 8-10, on the content and methods of instruction in psychiatry. Dr. Adolf Meyer, Baltimore, will be in charge of the conference, to which all physicians engaged in the teaching of psychiatry are invited. Clinics and demonstrations will be a part of the program.

Society of Pathologists.—The Pacific Northwest Society of Pathologists was recently organized with Drs. Frank R. Menne, Portland, Ore., as president; Delbert H. Nickson, Seattle, vice president, and Thomas D. Robertson, Portland, Ore., secretary. Membership is confined to physicians limiting their activities principally to pathology and the allied sciences. Members must have qualifications equal to those required by the American Society of Clinical Pathologists and the American Society of Pathologists and Bacteriologists.

Changes in Status of Licensure.—The Virginia State Board of Medical Examiners reported the following action:

Dr. Boyd E. P. Dickerson, formerly of Abingdon, license revoked at the December 1935 meeting because of his conviction on a charge of violating the Harrison Narcotic Act.

The Massachusetts State Department of Registration announces the following:

Dr. Joseph N. Tessier, New Bedford, license restored, December 18.
Dr. Sarah Margaret Brown, Boston, license restored, December 12.

The Public Health Council of West Virginia reports the following action taken Oct. 29, 1935:

License of Dr. Chester Arthur Hutchinson, formerly of Appalachia, Va., revoked after he had been found guilty of murder in the first degree.

The following action has been reported by the Kansas State Board of Registration:

Dr. Guy E. Brewer, Garber, Okla., license revoked, Dec. 10, 1935, for conviction of a felony.
Dr. John B. Armstrong, Topeka, license restored December 10.

Plotz Foundation Grants.—During 1935, the twelfth year of the Ella Sachs Plotz Foundation for the Advancement of Scientific Investigation, twenty-five grants were made to finance research on problems in medicine and surgery or in branches of science bearing on medicine and surgery, one being a continued annual grant. Twelve went to investigators outside the United States. In the twelve years of its existence the foundation has made 252 grants to workers in twenty-six countries. Applications for grants for the year 1936-1937 must be in the hands of the executive committee before May 1. There are no formal application blanks, but letters asking for aid must state definitely the qualifications of the investigator, the nature of the proposed research, the size of the grant requested and the specific use of the money to be expended. It is desirable to include letters of recommendation from the directors of laboratories or clinics in which the work is to be done. Applications should be sent to Dr. Joseph C. Aub, Collis P. Huntington Memorial Hospital, 695 Huntington Avenue, Boston.

Foundation to Study Air Hygiene.—The Air Hygiene Foundation of America, Inc., has been formed by a group of industries to conduct investigations and stimulate research in the field of air hygiene, to gather and disseminate facts relating thereto and to assist other agencies in the same activities. It will also cooperate in the coordination of such research efforts. Mr. Harry B. Meller, head of the air pollution investigation at Mellon Institute of Industrial Research, Pittsburgh, has been appointed managing director of the foundation, with headquarters in Pittsburgh. Mr. Meller is a former dean of the University of Pittsburgh School of Mines. Frank F. Rupert, Ph.D., industrial fellow in physical chemistry at Mellon Institute, will assist him. For the medical phases of research to be conducted by the foundation Dr. Samuel R. Haythorn, professor of preventive medicine, University of Pittsburgh, has been appointed medical adviser. A comprehensive investigation has been begun at Mellon Institute with the support of the new foundation, of the hygienic, technologic and economic aspects of air contamination, especially by dusts in the industries.

Medical Bills in Congress.—*Bills Introduced:* S. 3834, introduced by Senator Van Nuys, Indiana, proposes to make it unlawful to sell certain spirits containing alcohol produced from materials other than cereal grains. H. R. 10586, introduced by Representative Doughton, North Carolina, proposes to abolish the Bureau of Narcotics and to transfer the duties heretofore imposed on that bureau to the Secret Service Division of the Treasury Department. H. R. 10711, introduced by Representative Green, Florida, proposes to authorize an appropriation of $1,000,000 to construct a marine hospital at Jacksonville, Fla. H. R. 10721, introduced (by request) by Representative McCormack, Massachusetts, proposes to grant pensions to men engaged in or connected with the military service of the United States or state troops during the period of Indian wars and disturbances, and to the widows of such men. H. R. 10769, introduced by Representative Starnes, Alabama, proposes to provide that the rating as to the degree of disability of any veteran, to whom pension or compensation for disability has been or is hereafter awarded under the laws authorizing pensions or compensation to veterans of the World War, shall not be reduced, except under certain conditions. H. R. 10771, introduced by Representative Utterback, Iowa, proposes to grant pensions and increase of pensions to widows of certain sailors, soldiers and marines of the Civil War.

Society News.—Chauncey D. Leake, Ph.D., professor of pharmacology, University of California School of Medicine, San Francisco, was elected president of the History of Science Society at its annual meeting in St. Louis in January, it is reported.——The North Pacific Surgical Association held its annual meeting in Portland, Ore., December 6-7, with Dr. Frederick A. Coller, Ann Arbor, Mich., as guest speaker. Dr. Coller discussed "Dehydration and Water Balance in the Surgical Patient," "Fascial Planes in Relation to Infection" and "Ambroise Paré: The Man Who Brought Respectability to Surgery."——The American Academy of Ophthalmology and Otolaryngology will hold its annual meeting, September 26 to October 3, at the Waldorf Astoria in New York.——Dr. Melvin S. Henderson, Rochester, Minn., was installed as president of the American Academy of Orthopedic Surgeons at the annual meeting in St. Louis, January 13-16. Dr. Arthur Bruce Gill, Philadelphia, was chosen president-elect; Dr. William B. Carrell, Dallas, Texas, vice president; Dr. Eugene Bishop Mumford, Indianapolis, treasurer, and Dr. Philip Lewin, Chicago, secretary. The next annual session will be held in Cleveland, Jan. 11-13, 1937. San Francisco is being considered for the place of meeting. The gold medal of the academy was awarded to Dr. Henry H. Kessler, Newark, N. J., for his exhibit on

V 106
1936

"Cineplastic Amputation."——Mr. Ernest J. Swift, secretary-general of the League of Red Cross Societies, with headquarters in Paris, has been recalled to the United States to succeed the late Col. Ernest P. Bicknell as vice chairman in charge of insular and foreign operations of the American Red Cross.

FOREIGN

Retirement of Professor Ghon.—Dr. Anton Ghon, chief of the institute of pathologic anatomy in the German University of Prague, Czechoslovakia, since 1910, retired recently at the age of 70. Professor Ghon has published during his career more than 150 scientific papers as well as books and monographs.

Conference on Laws of Warfare.—A conference of military physicians and lawyers specializing in the study of international law will be held at Monaco, February 10-12, in cooperation with the International Red Cross Committee to consider problems of the laws of warfare. Information may be obtained from Dr. J. Voncken, Conference on Medicolegal Studies (Session d'Etudes Médico-juridiques), Quai de Plaisance, Monaco.

Mental Hygiene Congress Postponed.—The second International Congress on Mental Hygiene will be held in Paris in July 1937 instead of in the present year, as previously planned, the executive committee announces. For further information write to Clifford W. Beers, general secretary of the International Committee for Mental Hygiene, 50 West Fiftieth Street, New York, or to Dr. Edouard Toulouse, president of the congress, 1 rue Cabana, Paris.

Deaths in Other Countries

Dr. William Blair-Bell, emeritus professor of obstetrics and gynecology at the University of Liverpool, died, January 26, at West Felton in Shropshire, aged 65.

Government Services

General Delaney Retires

The retirement on his own application of Brig. Gen. Matthew A. Delaney, assistant to the surgeon general, U. S. Army, November 30, has been announced. He is 61. General Delaney graduated from the University of Pennsylvania School of Medicine in 1898. In 1928 he received a certificate of public health from Harvard University School of Medicine. General Delaney has been with the medical department of the U. S. Army since 1901. He served in the Philippine Insurrection and was White House physician during President Taft's administration from 1909 to 1913. During the World War he was in charge of base hospital number 10 and was later detailed as liaison officer with the British War Office. He was formerly assistant executive in the surgeon general's office. He received the Distinguished Service Medal in recognition of efficient operation of his unit in France and was decorated by the British government.

Annual Report of Public Health Service

The mortality rate for the calendar year 1934 in states reporting to the U. S. Public Health Service was 10.9 per thousand of population, according to the annual report of the surgeon general for the fiscal year ended June 1935. This is slightly higher than the rate for 1933 for the same states (10.5) but lower than any recorded rate earlier than 1932, when the rate was 10.8. The birth rate for 1934 was 17.1 per thousand of population as compared with 16.6 in 1933, representing 93,975 more births in 1934 than in 1933. The increase of 3 per cent is noteworthy because the birth rate has been decreasing for several decades. In 1934 the infant death rate was 59.9 per thousand live births as compared with 58.2 in 1933. However, the 1934 rate was lower than for any year earlier than 1932. The rate of 56.2 per hundred thousand of population for tuberculosis was the lowest for this disease ever recorded by the service. A mortality rate of 3.3 per hundred thousand of population was recorded for both typhoid and diphtheria. A new low rate was reported for smallpox, 5,371 cases, with no cases being reported in Maine, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland or the District of Columbia. Neither cholera nor yellow fever appeared in the United States, although about 1,000 cases of cholera were reported in the Philippine Islands. Since 1928 the death rate from pellagra has been decreasing until in 1934 a rate of 3.2 per hundred thousand was indicated for forty-five states. An unusual occurrence of dengue fever was reported, with 2,005 cases in Florida, 1,962 in Georgia and 1,072 in Alabama. The report points out that the actual number of cases was much higher, as many are not recorded. A fatal case of bubonic plague was reported in Lake County, Ore., in May 1934 and a case in Tulare County, Calif.; 197 plague-infected ground squirrels and one plague-infected rat were found in California during the year. There were 254,551 cases of syphilis and 161,810 cases of gonorrhea reported by state health departments. Special surveys to determine the true prevalence of these diseases revealed that there are about 518,000 new cases of syphilis in the United States each year and 1,555,000 of gonorrhea. There was a widespread outbreak of poliomyelitis in North Carolina and Virginia, the first in the South.

Of 730,777 alien passengers and 696,562 seamen examined at various ports, 14,569 and 1,250 respectively were certified as being afflicted with some mental or physical defect or disease. There were 35,978 applicants for immigration visas examined. There were 15,262 vessels and 1,924,556 persons inspected at continental and insular ports and 168 vessels and 45,939 persons at foreign ports. Of 4,081 arriving airplanes carrying 34,135 persons, 2,636 planes with 30,249 persons were inspected. The remaining planes arrived at ports at which no medical officer of the service was available. During the year 1,147 vessels were fumigated at United States ports because of disease on board or for the destruction of rats. Because of the high mortality rate from malaria imported into the United States from Mexican territory, officers of the service at Texas-Mexican border stations were directed, in cooperation with the state health officer of Texas, to make a microscopic examination of the blood of any arriving person suspected of malaria and to notify the Texas State Department of Health of the name and destination of every person with malaria released for entry into the United States. Persons found to be infected were certified to the proper authorities for consideration of exclusion until cured.

To cooperative federal aid is attributed the increase in full time health units from 530 in 1933 to 540 in 1934. The service continued trachoma eradication activities in Kentucky, Missouri and Tennessee in cooperation with state authorities. Of 1,750 vessels engaged in interstate traffic, 51.4 per cent were reinspected and certified as complying with the regulations governing drinking and culinary water systems. Assistance was given to states on stream pollution programs.

Hospital and outpatient care was furnished to American seamen and other beneficiaries at 154 ports; 332,034 accredited persons applied for treatment and other medical service. In this work, 1,801,768 hospital days and 1,150,981 outpatient treatments were furnished to legal beneficiaries at a per diem cost of $3.31.

A total of 284.4 liters of Rocky Mountain spotted fever vaccine was produced during the fiscal year 1935, 36.6 liters more than in 1934. About one fifth of the supply was furnished to the Civilian Conservation Corps in the infected areas. Cases of the disease were reported for the first time in Illinois and Oklahoma and new endemic areas were reported in Montana, Idaho and California; it is now present in thirty-four states. Studies of the relation of sickness to the depression were continued and great differences in sickness rates were found between persons on relief and those not on relief. Further success is reported in the use of formaldehyde sulfoxylate as an antidote for mercury bichloride poisoning.

The International Sanitary Convention for Aerial Navigation was ratified by the United States June 13, 1935, and became effective November 22. The first federal narcotic farm was opened at Lexington, Ky., May 29, 1935, with a bed capacity of 1,000. A similar institution will be opened at Fort Worth, Texas. More than 1,500,000 dental examinations of children in twenty-six states were compiled, classified according to color, sex, age and size of area in which the children live.

The report recommends, among other things, enlargement of the commissioned personnel of the public health service; erection of new hospitals at Miami, Fla., Portland, Me., and Los Angeles, and the completion of the marine hospital at Stapleton, N. Y., to provide for a total of 1,200 beds. Additional quarters for commissioned and other personnel are required in Baltimore, Norfolk, Fort Stanton, Seattle and Savannah, and recreational buildings at New Orleans, Carville and Fort Stanton.

A fund of $10,687,883 was available for the activities of the service during the year; of this amount $10,584,496 was expended.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Jan. 4, 1936.

The Tragedy of Hugh Owen Thomas

In the months before his death in 1933, Sir Robert Jones discussed with his son-in-law, Mr. Frederick Watson, the publication of a centenary volume on the life and principles of his uncle and master, Hugh Owen Thomas. In place of the book that Jones was prevented by death from writing, two volumes have appeared. One, a personal study of Thomas by Watson, was reviewed in THE JOURNAL, March 23, 1935, p. 1018. The other, "Hugh Owen Thomas: His Principles and Practice," by Mr. D. McCrae Aitken, an orthopedic surgeon who was for thirty years associated with Sir Robert Jones, recently appeared. These two books are an interesting experiment in biography, the story of Thomas's personal life and ancestry being told by Watson, a literary man with experience in biography, while his technical work is independently described by a surgeon, whose long association with Jones renders him especially fitted for the task. Mr. Aitken's book and the short articles to which it has given rise in medical journals bring the centenary publications to a close. Indeed, but for the centenary lecture by McMurray, published in the *Liverpool Medico-Chirurgical Journal* (THE JOURNAL, June 22, 1935, p. 2275) no further notice has been given to the man who, in the words of John Ridlon, "did more for orthopedics than all the rest since Hippocrates."

The fundamental principle of Thomas's treatment of diseased joints was "enforced uninterrupted and prolonged rest," which he carried out by his inimitable splints. The surgeons of his day did not understand rest, to which he gave a meaning extending far beyond that of Hilton. They performed amputations and excisions of tuberculous joints, which he showed to be unnecessary. His methods of diagnosis as well as of treatment have become the basis of modern orthopedics. Yet from his writings, all of which have stood the test of time, many valuable details that are far from generally known may still be gleaned. These are well summarized by Mr. Aitken. Thomas pointed out that the earliest sign of joint disease is defect of normal movement. The earliest sign of hip disease in a child might be a slight limp, not necessarily any definite complaint of pain or effusion of fluid into the joint. If testing by gentle passive movement beyond the range voluntarily performed produced muscular spasm, the diagnosis was complete. The spasm was nature's attempt at rest, which could be better given by a splint, the efficiency of which was shown by disappearance of all spasm. If this did not occur, the splint was not efficient or not properly applied, or the patient undid the bandage, allowing movement. The fixation of the limb must not impede free circulation in the joint. This was accomplished by his own splints. He disliked plaster of paris, for he thought that it impeded the circulation. Continuous tension he also objected to, because it hindered the circulation. For this reason he aspirated distended joints. When acute symptoms subsided he had his patients with hip, knee and ankle disease get up. They had a patten on the sound limb to keep the diseased one off the ground. As long as control of the affected joint was maintained, he considered exercise an advantage. He held that prolonged fixation never produced permanent stiffness in healthy joints and that the best chance of recovery with movement was given by complete rest from the beginning. On the other hand, any movement of the inflamed joint would tend to produce ankylosis. Mr. Aitken says that unfortunately this rule has not yet been accepted by those who treat the various types of rheumatic arthritis. Thomas throughout his writings warns against breaking down contracted joints by forcible manipulation. He wrote: "Joints that have perfectly recovered either from injury or disease regain motion earliest by being employed in the ordinary manner. Joints not in a healthy condition automatically resent attempts at compulsory use. Passive movements applied to injured or diseased joints delay recovery and, if applied to cured joints, delay complete restoration of function." Discussing adhesions following injuries, he says: "Manipulating joints that are stiff from any abnormal condition of their muscles is wrong. When it has relieved stiff joints, some risk has been run and the gain has been only time."

Mr. Aitken quotes extensively from the First Thomas Memorial Lecture delivered at Liverpool by Sir Robert Jones in 1922, a document of the first importance which for some reason has been published only in abstract. It is Jones who has transmitted Thomas to future generations. This lecture further reveals the discreditable treatment of Thomas by his contemporaries. Jones said: "When I look back on those early years, when he preached as one in the wilderness, when only one surgeon, in this city, of scholastic attainment and vision realized the importance of his work, it is little less than a romance that thirty years after his death, when all but great reputations have perished, we are assembled to inaugurate triennial lectures to his memory. Few academic honors came to him, one from Spain, another from America. . . . He always felt, however, in the midst of opposition, that he was formulating sound surgical principles of vital import. . . . Parker's friendship and encouragement at a time when help was badly needed meant a good deal. He ran considerable risk in regard to his future prospects by so closely associating with Thomas. An interesting story might be written of the petty tyranny and persecution to which Thomas at that time was subjected by certain of his distinguished Liverpool contemporaries." It may be added that Jones, the nephew, pupil and successor to Thomas, seems to have succeeded to some of the prejudice against his master, Thomas. This is shown by the long time that elapsed before his position was acknowledged in this country and by opposition to his appointment as head of the orthopedic service of the army in the great war. Yet he was "no fighter," as Thomas lamented to Ridlon, and therefore the excuse given in the medical press that Thomas's treatment was due to his pugnacity does not hold. Other great pioneers who were not in the least pugnacious, such as Lister, encountered the same opposition from smaller men in high places. Jones, unlike Thomas, had no vitriolic pen for his enemies. He simply taught Thomas's principles and made them acceptable to the surgical world. This was his greatest achievement, as Ridlon says. In Aitken's phrase, he succeeded by peaceful penetration where Thomas failed by frontal attack. But it is tragic that Thomas should have died only hoping that some day his principles would triumph. An important journal tells us that he "is rapidly coming into his proper place among the leaders of medicine." This after he has been dead over forty years and after Jones spent a lifetime in teaching his principles! Truly we are conservative and in no hurry to recognize our great men. The one shining exception to the neglect and opposition which Thomas encountered was furnished by Mr. Rushton Parker, a young surgeon, just returned to Liverpool from University College Hospital, where he was a favorite pupil of Erichsen. He afterward became professor of surgery at Liverpool and gave Thomas his powerful support, as mentioned by Jones. It was he who persuaded Thomas to publish the book which brought Ridlon to Thomas and so led to his work being known in America, for no one has paid tribute to Thomas with such eloquence as Ridlon.

V 10
1936

PARIS

(From Our Regular Correspondent)

Dec. 27, 1935.

Vaccination Against Yellow Fever

Fear has been manifested with regard to the possible danger for the population, in countries where yellow fever is endemic, of amaril vaccination. It has been alleged that the virus, even though altered by passage in the brain of mice, can be present in the blood, during the process of immunization, and be taken up by mosquitoes and finally inoculated into some nonimmune man or monkey. Davis, Lloyd and Frobisher point out that the so-called neurotropic virus, adapted to the mouse, can only with difficulty be transmitted to Macacus rhesus. But one must not forget that Macacus rhesus is highly receptive to amaril virus, much more so than man. It is theoretically possible to immunize the fixed population of towns against yellow fever but much more difficult to protect the traveling public, and the danger is much greater since the better communications today make a melting pot of the formerly segregated tribes of West Africa. The virus reservoir is now to be found not only in the Sine Saloum country but also in the whole of the West Africa federation, including perhaps the wild beasts. Drs. Mathis, Durieux and Advier recently reported to the Académie de medecine their experiments on the possibility of infecting normal individuals by mosquitoes which have fed on people immunized by the Sellards-Laigret technic. Dr. Mathis and his co-workers, after trials on monkeys, experimented on man. The individuals who submitted to the bites of numerous mosquitoes that had fed on men in process of vaccination by the Sellards-Laigret method remained uninfected. Further evidence of the harmlessness of inoculations with the Sellards-Laigret method is that thousands of people, white and colored, were inoculated and no cases were ever mentioned of yellow fever in any of them.

The Dispensaries and Tuberculosis Mortality

The city of Lyons, the third largest of France, numbers almost 600,000 inhabitants. A systematic struggle against tuberculosis was begun in Lyons thirty years ago, by the creation of the Jules Courmont Dispensary. Lyons now has nine similar dispensaries, which in 1934 treated 16,000 patients, sent to the preventorium 1,378 children, and kept under observation 8,000 families and 22,000 persons who had been in contact with tuberculous persons. Careful statistics, presented by Dr. Paul Courmont to the Académie de médecine, show that during the last thirty years the mortality from tuberculosis has diminished more than that of the mortality in general. This decrease has been especially important in populous districts having a high death rate; and the betterment of the mortality rate has increased in proportion to the successive foundations of dispensaries in various districts before unprovided with them. In the one district without a dispensary, the mortality remained high, decreasing only 28 per cent in thirty years, in comparison with 55 per cent in the rest of the city. Dr. Courmont's statistics include the mortality from all forms of tuberculosis and not only pulmonary tuberculosis.

The Etiology of Cerebral Hemorrhage

The old theory of anatomic alterations of the cerebral arteries cleared the way to the vasomotor theory, according to which spasm of the arteries is responsible for breaking the walls, or for capillary hemorrhage or for diapedesis of the red cells. But that concept is in opposition to the view that the cerebral arteries are not affected by violent vasomotor changes and enjoy a certain amount of independence. Drs. E. Frommel and A. D. Herschberg of Geneva explain in the *Journal de physiologie et de pathologie générale* that such vasomotor reactions are not caused by variations in the autonomic nervous system of the cerebral arteries but by a chemical regulation due to the cellular metabolism. In our almost absolute ignorance of the metabolism of the nerve cell, we can enumerate only a few substances which chemically regulate the vessels and especially the cerebral arteries. Besides such hormones as epinephrine and thyroxine there are many products of cellular metabolism to which the cerebral vessels are sensitive, such as choline, histamine and histidine, derivatives of nucleic acid, present in every tissue, of which the most important representative is adenosine phosphoric acid. One must mention near the products of the cellular metabolism the power of the organism to fix oxygen in the tissues, and carbon dioxide, acidosis leading to vasoconstriction and alkalosis to vasodilatation. These effects of cellular metabolism are not simple retention of certain products more or less toxic but a matter of permitting certain substances, inadequately metabolized, to remain in the organism and influence the nervous system. The anatomic state of the cerebral arteries certainly plays a part in cerebral hemorrhage, but it is only one of the conditions present. The experiments of Drs. Frommel and Herschberg on the action of certain substance injected directly into the brain of guinea-pigs seems partly to confirm their chemical theory.

BERLIN

(From Our Regular Correspondent)

Dec. 16, 1935.

How Do Amputations Affect Human Beings?

Dr. Ruth Wilmanns of Basel recently reported in the *Klinische Wochenschrift* follow-up studies of the physical and mental condition of 309 patients who had had an arm or a leg amputated within the last twenty years. The operation had been made necessary by injury in 101 of these cases, by disease in 196 cases and by deformed and crippled conditions in twelve cases. Tuberculosis was the cause in 36 per cent of the cases, arteriosclerotic gangrene and diabetic gangrene in 17 per cent, and malignant tumors in 11 per cent. In ninety-five cases the subsequent condition of the patient could be determined with exactitude. In critical examinations of this sort the individual predispositions of each patient had to be considered. With this in mind, the following conclusions may be set forth: The handicap of a congenitally defective or absent limb is in man surprisingly easy to overcome, a fact already well known in institutions for the crippled. When a limb is lost by amputation during youth, the handicap can be sufficiently mastered. Moreover, traumatic neuroses and personal injury neuroses are scarcely ever found in young persons. Amputation taking place during the period of involution or senility, when the patient no longer possesses the agility of youth, produces quite different results. The psychic condition is different; optimism and vital energy together with a stern will to overcome the handicap are no longer present. In middle aged adults the reaction to the loss of a limb depends largely on idiosyncrasy. Intellectual predisposition of course plays a decisive part in such cases and external factors, such as environment, early training and education, are important. The occupational background enters into the picture. Noteworthy are the differing reactions produced by the type of indemnification received for the injury by the patient. When it takes the form of an income the recipient regards the indemnity as insufficient, whereas settlement in a lump sum is seized on as a welcome prize. This lump sum settlement has no noticeable influence on the rehabilitation of the crippled person, but the lifelong income often prevents him from striving with all his energy for the restoration of his working capacity.

The results of the follow-up examinations were excellent throughout; only in five cases were suppuration of the sutures, or decubital ulcers found. Twenty-eight of the patients complained of areas of pressure during the heat of summer and

also of abscesses such as result from excessive perspiration. The most common complaint among patients who had undergone Pirogoff's amputation was the constant coldness of the stump. In addition, the skin of the stump end frequently in such cases inclined to cornification. Quite frequently pain resulted in one-legged patients from the heavy burden of the single leg. In nearly all these a pes valgus was noted. The older patients complained of a slight feeling of fatigue in the leg and the majority complained of backache. From the loss of arm or leg, scoliosis in varying degrees had resulted; no connection was found, however, between the magnitude of the loss and the severity of the scoliosis. Of the ninety-five patients, sixty-one still suffer pain, chiefly induced by the state of the weather; often they complain of imaginary pains. Experiments with prostheses are wholly individual. Here as in all these questions personality as well as external circumstances plays a different part in each case. Systematic training (schools for the one armed, walking schools) is moreover of particular importance.

Underwater Therapy for The Crippled

Balneologist Härtel of Kissingen recently read a paper before the Berlin Medical Society on the method employed at Warm Springs, Ga., and the good results obtained there. He also exhibited a film of the Warm Springs establishment in which were shown scenes of the systematic exercise in water therapy.

Following this, Dr. Scholtz, director of the hydrotherapeutic section of the Rudolph Virchow Hospital in Berlin, spoke on his experiments with lame persons. Movement in a crippled member is almost always first made possible by the removal of its weight in water; after the first movements, continued regulated bathing and training increase the strength of the limb and its power to control movement. The removal of the weight permits a concentration of power in the exercised member. The best results were produced in the treatment of spastic conditions. Special attention was also called to the psychic effect on the bather. In his section Dr. Scholtz has had success in numerous neurologic cases and also in the treatment of spastic and flabby conditions and in multiple sclerosis. Tabes, however, did not respond to the treatment. Scholtz presented a child who when the treatment began had been entirely crippled by poliomyelitis and who had recovered the normal use of the limbs. A boxer who had presented a center of hemorrhage in the upper spinal cord and who had been trained to walk again was also shown.

In closing, the hydrotherapeutic section of the Charité exhibited in film the remarkable improvement accomplished by this therapy in an old arthritic joint with severe pathologic changes.

"New German Medicine"

More and more frequent are reports concerning the movement that has as its objective the foundation of a so-called new German medicine. It is interesting in this connection to learn that in March 1936 a "National Convention of the Reichs-Arbeitsgemeinschaft (federal organization for a new German Medicine" will take place at Wiesbaden and that its final session will be held in conjunction with a meeting of the German Society of Internal Medicine. On this day the topic of internal treatment of thyrotoxicosis will be discussed, the principal reports to be submitted by the Berlin internist Professor Siebeck and the director of the aforementioned Reichs-Arbeitsgemeinschaft, Professor Kötschau of Jena. Other reports will treat of the question from various standpoints such as the psychotherapeutic, the homeopathic and the naturopathic, and finally one physician will deal with the question "as a country doctor."

Not long ago the University of Jena held its first "Schulungslager (training camp) for Biologic Medicine," to which the Society of German Students sent medical students as representatives from all the state universities of Germany. This schulungslager serves the purpose of making biologic thought available to the future physicians. Participants in the "camp" had explained to them in a series of theoretical lectures the fundamentals of homeopathy and motor and water treatment as well as herb medicine, which the practical exercises also served to demonstrate.

The Diagnostic Institutes

Just as some time ago the question of the designations appearing on office name plates of physicians was regulated, so now the scope of the diagnostic institutes has been defined. The Berlin Aerztekammer (Chamber of Physicians) together with the Kassenärztlichen Vereinigung Deutschlands (Union of Physician's Associations of Germany) has determined that it is necessary "in the interest of clarity and of a clearly defined separation of the various fields of medicine" that a physican devote himself either to medicodiagnostic activities or to private practice. He must no longer engage in the two at the same time. These institutes shall from now on undertake only examinations of patients referred to them by association member practitioners. An exception is made in the case of blood examinations, for which practitioners may obtain a special license. Physicians holding such licenses should display on their name plates besides the inscription "praktischer arzt" (general medical practitioner) or "facharzt" (specialist) the additional words "officially licensed for serologic blood examinations." Those physicians continuing in practice receive compensation for such examinations only from patients coming to them in the course of private practice. All physicians who wish to engage in medicodiagnostic activity must decide between such activity and the actual practice of medicine.

VIENNA

(From Our Regular Correspondent)

Dec. 18, 1935.

The Population of Vienna

In a study of the population of Vienna just published by Dr. Ernst Fürth in the *Oesterreichische Arzt* are data gleaned by comparing the census of Dec. 24, 1923, with that of March 22, 1934. This study clearly shows the fall of the birth rate and also of the death rate. For the ten years the deaths exceeded the births by 58,845. Consequently a decrease in the city's population would have set in had not immigration, chiefly of young persons, compensated for the deficit. The population was 1,865,780 in 1923 and 1,874,130 in 1934. The males numbered 860,119 in 1923 but only 846,422 by 1934. The corresponding figures for females show an increase from 1,005,661 in 1923 to 1,027,708 in 1934. Thus within ten years the number of males decreased by nearly 14,000, while the females showed an increase of more than 22,000. In Vienna particular improvement is to be noted in the age groups from 0 to 1 year and from 1 to 5 years, whereas for all Austria the death rate in the first year of life amounted to 115.45 male and 92.40 female children for each thousand live births. The corresponding figures for Vienna show 72.76 for males and 61.73 for females. For women from 40 to 65, the death rate had fallen to two thirds of the rate for men in the same age group. Only in the age group from 15 to 20 is the mortality of the females almost the same as that of the males. In all the other age groups the female death rate is invariably lower. The mortality among legitimate children in Vienna has been in recent years exceeded by that of illegitimate children. In 1900 the mortality of legitimate children amounted to 195 for every thousand live births, that of illegitimate children 185; in 1910, 159 legitimate against 191 illegitimate; in 1923, 89 against 189; in 1934, 57 against 103. This shows that until 1923 the death rate among illegitimate children remained approximately stationary, while the rate for legitimate children decreased by 60 per cent. In the last decade the rates for the two categories

V 106
1936

descend in almost equal measure. The death rate for the entire population decreased from 16.20 for every thousand inhabitants in 1923 to 12.20 in 1934. The rate for females was from 2 to 3 per cent less than that of the males (13.36 per cent for males, 10.95 for females in 1934). At the same time it was shown that tuberculosis, of all the causes of death, decreased most constantly (about 50 per cent in ten years). Although the rate for the higher groups decreased but little, a steadily smaller number of younger persons succumbed to this disease. Of all those dying of tuberculosis, 40 per cent had passed the age of 50. The tuberculosis mortality of females was about 50 per cent lower than that for males. Only past the age of 60 did the death rate among females exceed that of the males. Also as regards deaths from cancer the female sex is better

TABLE 1.—*Age Groups in Vienna*

Age of Inhabitants	Per Cent of Male Population	Per Cent of Female Population
From 0 to 6	4.62	3.72
From 6 to 14	10.52	8.40
From 14 to 60	72.97	73.57
Over 60	11.89	14.31
	100.00	100.00

off than formerly, since the earlier preponderant number of cancer deaths in women has steadily decreased. For the entire population the rate over a period of fifty years amounted to 1,000 males to 1,350 females. In the ten year period here studied, however (without regard to age), the rate was 1,000 males to 1,155 females. The greatest number of cancer deaths will occur in men between the ages of 60 and 70, in females after the age of 70. The same holds true for diseases of the circulatory system, of which women are victims much later in life than men. All these facts show that the health of the female sex has in general been vastly improved. Women have acquired and preserved a greater resistance to lethal influences up to the highest age groups. Changes within the separate age groups are even more marked than was the case ten years ago. There are many more old women than in former times and more in proportion to old men. Of all the cities of middle Europe Vienna still contains the largest number of women aged 60 or more. Table 1 illustrates the existing proportion of age groups in Vienna.

One cannot state on the basis of these statistics that the Viennese population is superannuated even though the younger groups may be numerically inferior, nor is the danger of a preponderance of the aged and a deterioration in the population through eventual lack of youthful inhabitants indicated. An optimistic outlook should be drawn from the results of this study.

The Water Supply of Vienna

A short time ago the Vienna Health Bureau celebrated the twenty-fifth anniversary of the opening of the second alpine spring aqueduct. A Festschrift published for the occasion contains data on the history of Vienna's water supply. Before 1836, Vienna's fresh water came from local sources and amounted to only 1,600 cubic meters (tons) daily. In that year a new source was utilized, which provided the city with an additional 10,000 tons daily. This was supposed to have been filtered, yet in 1873 an analysis showed the water to contain "cotton fibers, bird feathers and woolen threads." In those times there were many fatal cases of typhus and cholera. The number of deaths from typhus fluctuated between 412 in 1864 and 1,584 in 1855. The average was 845 deaths annually, or 170 for each hundred thousand inhabitants. Between 1831 and 1873 more than 20,000 persons died of cholera in Vienna. The water brought in was not pure and the quantity was insufficient (20 liters a day for each inhabitant). In addition, much water was drawn from house wells, another source of disease. In 1873 the first alpine spring aqueduct was placed in service, providing pure water. Immediately the number of typhus fatalities decreased. From 1874 to 1883 the annual average was 251 as compared with the earlier 845. During that period, 80 per cent of the houses in Vienna were connected with the new water supply. Since 1888 every building in Vienna has been supplied with pure water. The number of deaths from typhus has steadily decreased. In 1934 there were only twenty-one such fatalities; in 1918 there were 170. The average mortality from typhus for each hundred thousand inhabitants in the period 1891-1930 was four, or one-fortieth that of the period 1851-1870. Since 1873, cholera has entirely disappeared. In that year there were still 2,854 fatal cases recorded. Forty-seven imported cases were reported for the years 1892, 1893, 1910, 1914 and 1915. True smallpox is today practically unknown here. When the first aqueduct became insufficient, owing to the growth of the city, the second aqueduct was constructed in 1910 to bring Vienna water from a location 170 kilometers (100 miles) distant. The source of the water was located at 6,000 feet above sea level. The two aqueducts supply Vienna with about 380,000 tons daily, which means 200 liters for each inhabitant every twenty-four hours, although the average daily consumption is only 145 per capita. An abundant supply is thus assured. Vienna is known for the excellent quality of its water. The temperature of this water is 8 C. (46.4 F.) both summer and winter. It is moderately hard and absolutely free from noxious infusions. Every building in Vienna is connected with this water supply.

The Care for Aged Physicians

For more than thirty years, the problem of care for aged physicians in Vienna and in the rest of Austria has been under discussion. In only one Austrian province (Upper Austria) a welfare association has existed for the last fourteen years as a private undertaking of the local medical group. It includes all Upper Austrian physicians and provides for their widows and their orphans but it is not established on the technical basis of a life insurance organization. Aside from this there exist for Austrian physicians only so-called burial clubs or sick benefit clubs and benevolent committees. Since 1933 there has been worked out for the first time, at least for Vienna, pos-

TABLE 2.—*Periods When Physicians of Vienna Were Born*

Period	Men	Women	Totals
1845-1850	4	0	4
1851-1860	59	1	60
1861-1870	487	1	488
1871-1880	639	14	653
1881-1890	617	76	693
1891-1900	1,188	287	1,475
1901-1910	903	212	1,115
1911	1	...	1
Totals	3,898	591	4,489

sibly for all Austria, a serious plan for the establishment of old age pensions for physicians. The plan is based on exact statistics concerning the medical profession. Immediate opposition was encountered from those physicians both in Vienna and in the provinces who, as employees of public corporations, already enjoyed pensions and insurance benefits for themselves and for their survivors. The new plan, operated on a life insurance basis, would supersede all present pension systems in public institutions. Because of the physicians' own attitude it is now problematic whether this new system will ever be put into practice. In former times the more favorable financial situation would have better fostered such an organization. Dr. Sonnefeld proposes that all physicians regularly attached to hospitals (that is to say, about 90 per cent of the medical profession) should be taxed 10 per cent and with the funds so obtained a foundation would be set up which, together with

small monthly contributions, would suffice to provide for all physicians and would grant to all who have reached the age of 65 an old age pension of some 250 shillings monthly. It also provides for the compulsory retirement of all physicians who have reached that age in order to give ampler opportunities to the younger members of the profession. Later, the age of retirement could be changed to 60. Dr. Sonnefeld further includes some interesting statistics on the age groups of physicians in Vienna as follows: In Vienna reside 4,489 registered physicians, 591 of whom are women. Of these physicians, two men are 90, one 89, one 86, two 84, and thirty-nine from 83 to 76. There are eighteen men and one woman 75 years of age. The second oldest woman physician is 65 and fourteen women are between 64 and 55. The youngest physicians include one man of 24 and twenty-nine men and seven women of 25. Physicians who died in the years 1929 to 1934 inclusive numbered 361; thus the average for six years corresponds with tolerable exactitude to the mortality rate of the population as a whole.

BUCHAREST

(From Our Regular Correspondent)

Nov. 8, 1935.

The Gradation of Official Physicians

A new act distinguishes five groups of physicians in the public service, according to whether they are concerned with hygiene, healing, laboratory work, administration in cities or forensic medicine. Specialists in any branch of medicine must produce evidence of having studied their branch for at least four years after graduation. The law recognizes as specialists those who, before its proclamation, were university professors, lecturers, assistants, or senior hospital physicians. Private physicians will be recognized as specialists only if they can supply documentary evidence of having worked in their specialty for at least five years.

In the public service the following ranks are established: junior physician, titular physician, physician-in-chief, principal physician, inspector-general physician and consulting physician. As a rule, every one must begin his public career as a junior physician and must spend two years in this capacity. If by then he is unworthy of promotion he remains in the same rank for a further year and if he still does not deserve advancement he must leave the public service. In exceptional cases, a man may join the service as titular physician or physician-in-chief if he has served in a private hospital for two years and four years respectively and has especially good qualifications. Advancement is not certain in every case but takes place according to merit. One must, however, spend at least two years as junior and four years as titular physician. The rank of inspector general is reserved for the most prominent physicians and appointment is subject to the recommendation of a special commission. Their total number cannot exceed thirty in the whole country. If an inspector general has shown particularly useful and conscientious activity he receives on retirement the title of medic consilier sanitar. The new law considerably raised the grades. The old law knew only four grades, each promotion bringing a 15 per cent rise of the salary. The new law is more liberal and provides five grades, each with 25 per cent rise, and the total increase of 125 per cent, together with several additional sources of income, ensures a comfortable livelihood. At the age of 60, every physician may be pensioned on the recommendation of the administrative commission. At 62 all must retire without regard to years of service.

The new law settles also the troublesome question of dental practice by declaring that dentistry can be carried on by duly qualified doctors or dental technicians who have specialized in stomatology. Those dental technicians who gained their right to practice before 1923 may continue their work without disturbance. Those whose license was not recognized by the revision in 1924, if over 42 years of age, will have to pass qualifying examinations in December, while those under 42 will have to attend a regular course, lasting one year, in dental technic and pass a final examination. Only those technicians are justified in applying for admission to the courses who before 1923 had already eight years' practice—two years as apprentices and six years as assistants in laboratories. Those who have passed matriculation examination in a secondary school and attended some foreign high school for dentistry, and obtained a diploma after four years' study, may carry on dental practice in Rumania without further notice. Dental technicians and also dental surgeons are not allowed more than one consulting room.

Diathermy, quartz light, x-ray and ultra short wave apparatus may be owned and used only by qualified physicians. Likewise electrolysis and electrocauterization should be applied by physicians, and this exclusively medical work must not be done by barbers, masseurs, manicurists, chiropodists or cosmetic institutes.

The new law puts a stop to brothels and all undertakings connected with the keeping of prostitutes. Henceforth licensed women will have to present themselves twice a week for medical examination—in towns and cities at the venereal dispensaries, in small towns and villages by the parish doctors.

Operative Treatment of Spasmodic Torticollis

Dr. Alexander Pop, lecturer to the university of Cluj, reports the case of a woman, aged 55, who for a period of three years had been the victim of spasmodic torticollis. Pressure at the point of entrance of the spinal accessory nerve of the right side into the sternomastoid muscle caused a temporary cessation of the convulsive movements. Nearly 2 inches (4.5 cm.) of this nerve was removed. While improvement followed the operation, the effect was not curative. Accordingly, ten months later a resection was made of the first, second and third cervical nerves as well as of the obliquus inferior. The result was entirely satisfactory. Freedom from convulsive movements gradually took place, and up to about one year there has been no recurrence.

Dr. Pop found in the literature reports of thirty cases of resection of the cervical nerves with twenty-three cures and seven improvements, twenty-one cases of section of the muscle with nine cures, six improvements and six failures and a great number of resections of the spinal accessory nerve with about one-third complete cures. Pop points out the necessity of resection of the first three cervical nerves in cases in which resection of the spinal accessory nerve is attended with failure.

Taxation on Basis of Prescription Writing

The financial administration of the town of Satumare, an industrial center, sent an order to all pharmacists of the town obliging them to keep records of the number of prescriptions written and the value of the drugs ordered on these by each physician and send such lists every month to the assessor's office. Of course, the government officials want to use these data for the taxation of physicians. The pharmacists protested, arguing that physicians, being their patrons, should not be obliged to make such records, which do not constitute a reliable criterion of the earnings of a physician. There are many physicians who, for instance, order a domestic liniment, when a young doctor, fresh from the clinic, prescribes three kinds of expensive proprietary medicines. On the other hand, the enactment is apt to be detrimental to the pharmacists as well as to the sick, because the tax would lead to fewer prescriptions—eventually even to the detriment of the health of patients. As the protest made by the pharmacists was of no avail, they in company with the physicians appealed to the prefect of the county asking his intervention against the enactment of the financial administration. On the intervention of the prefect, the state public prosecuting office instructed the

V 10
1936

pharmacists not to obey the enactment, which has no legal basis. He assured them that for not observing this decree no harm can be done to them. The prefect said that the records of pharmacists are just as secret as the diaries of physicians and should not be revealed for such a purpose.

Preservatives in Cream

The food department of the ministry of health has during the year been experimenting with the use of preservatives in cream, with the object of delaying the onset of sourness. The department recommended in 1925 that boric acid or mixtures of boric acid and borax should be the only preservatives permitted in cream, and that to a maximum amount of 0.25 per cent expressed as boric acid, the vessels containing the cream being labeled with the amount of the preservative used. The mixture of boric acid and borax is first heated to expel water and afterward reduced to a powder, together with the addition of saccharin or sucrose at times. Sodium salicylate or sodium benzoate is sometimes used in addition. Recent experiments prove that to keep cream sweet and salable for more than three or four days at a temperature of 20 C. (68 F.) from 0.2 to 0.3 per cent of "boron" preservative is insufficient but that 0.4 per cent is sufficient. Compulsory labeling of all treated receptacles is necessary, in view of the fact that some traders supply cream guaranteed free from preservatives.

Russian-Rumanian Exchange of Students

Professor Nitescu, as the official representative of Bucharest University, at the International Congress of Physiology recently held at Moscow, while there was invited by the leaders of the Moscow faculty of pharmacy to exchange a certain number of students, beginning next year. Both states will erect a special home in which the exchange students will be given free accommodations.

Compulsory Graduate Courses for Rumanian Physicians

The ministry of public health has prepared the draft of a new law, according to which, beginning in the spring of 1936, graduate study will be compulsory for all physicians living in cities of 50,000 inhabitants and over. The courses will be held in the public hospitals and the chief subject will be internal medicine. Only practical courses will be given and they will last from three to four weeks and will have to be attended once in every five years. The organization of the graduate courses will be the task of the chambers of physicians. Locum tenentes for country physicians attending the graduate courses will be provided by the chambers and the salaries due to them will be contributed by the state.

Marriages

EDWARD COTTON RAWLS, Stamford, Conn., to Miss Jean Beardsley Gledhill of West Norwalk, Dec. 21, 1935.

ALLAN R. PALMER, San Francisco, to Miss Lucile O'Connelly, of Fresno, Calif., at Redwood City, Nov. 25, 1935.

HARRY EUGENE TEASLEY, Hartwell, Ga., to Miss Nancy Dorothy Massey of Orlando, Fla., Dec. 25, 1935.

HERBERT FLAKE READLING, Durham, N. C., to Miss Sara Whiteman of Atlanta, Dec. 22, 1935.

BENJAMIN RUBINOWITZ, Columbia, S. C., to Miss Lucy Mae Felker of Newberry, Dec. 26, 1935.

ERNEST H. REYNOLDS to Miss Garnette Reynolds, both of Mayodan, N. C., Dec. 14, 1935.

WILLIAM A. O'BRIEN, St. Paul, to Miss Virginia M. Benton of Minneapolis, Nov. 28, 1935.

LEONARD JULIUS RABHAN, Savannah, Ga., to Miss Belle Sawilowsky, Dec. 25, 1935.

CHARLES E. RIESER to Miss Katherine Rosenheim, both of New York, recently.

Deaths

Charles Godwin Jennings ● Detroit; Detroit Medical College, 1879; secretary of the Section on Diseases of Children of the American Medical Association, 1888-1889, and chairman, 1892-1893, and vice chairman of the Section on Medicine in 1919; lecturer in chemistry, 1881-1882, professor of chemistry and diseases of children, 1883-1888, professor of physiology and diseases of children, 1889-1893, professor of diseases of children, 1893-1895, professor, practice of medicine and diseases of children, 1895-1910, professor of medicine, 1910-1918, Detroit Medical College and Detroit College of Medicine and Surgery; member of the board of trustees of the Detroit College of Medicine and Surgery, 1913-1919; past president of the Wayne County Medical Society, Detroit Academy of Medicine, American Pediatric Society, American Therapeutic Society and the American Congress of Physicians; member of the American Clinical and Climatological Association; master of the American College of Physicians, chairman of the board of governors, 1927-1931, and vice president and regent in 1931; member of the city board of health, 1903-1907, and president in 1906; served during the World War; consulting physician to the Harper Hospital, head of the department of medicine and chairman of the executive committee of the medical board, 1912-1925; consulting physician to the Grosse Pointe Cottage Hospital and chairman of the medical advisory committee; consulting physician to the Children's Hospital of Michigan, Detroit Tuberculosis Sanatorium and the U. S. Marine Hospital; attending physician to St. Mary's Hospital, 1882-1890, and the Woman's Hospital, 1895-1900; contributed to various textbooks and systems of medicine and to the periodical literature; formerly associate editor of *Annals of Clinical Medicine* and *Archives of Pediatrics;* aged 78; attending physician and chairman of the board of trustees and of the medical board of the hospital bearing his name, where he died, January 9, of pneumonia.

Ellwood R. Kirby ● Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1887; Medico-Chirurgical College of Philadelphia, 1901; at one time professor of genito-urinary diseases at the Medico-Chirurgical College of Philadelphia; chief medical adviser of the Red Cross during the Spanish-American War; director of public health of Philadelphia, 1900-1904; member of the city board of health; chief consulting surgeon, Masonic Home at Elizabethtown, 1914; formerly on the staff of the Philadelphia General Hospital; for twenty-five years medical director, staff of St. Mary's Hospital; aged 68; died, Dec. 26, 1935, of chronic valvular heart disease.

Thomas Eben Reeks, New Britain, Conn.; University of Maryland School of Medicine, Baltimore, 1901; member of the Connecticut State Medical Society; at one time director of the bureau of preventable diseases, State of Connecticut Department of Health, and deputy commissioner of health; past president of the Connecticut Public Health Association and the Connecticut Hospital Association; formerly health officer of New Britain; medical superintendent of the New Britain General Hospital; aged 56; died, Nov. 13, 1935, in the Deaconess Hospital, Boston, of adenocarcinoma of the stomach.

Stephen Roman Pietrowicz, Evanston, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1898; clinical professor of medicine, Loyola University School of Medicine, Chicago; at one time member of the school board; formerly superintendent of the Chicago State Hospital; fellow of the American College of Physicians; aged 62; chief of staff of St. Mary's of Nazareth Hospital, Chicago, where he died, January 12, of an abscess of the pancreas, diabetes mellitus and chronic nephritis.

William August Doeppers ● Indianapolis; Indiana University School of Medicine, Indianapolis, 1916; member of the Associated Anesthetists of the United States and Canada; for many years treasurer of the Indiana State Medical Association; served during the World War; at one time chief deputy county coroner; formerly superintendent of the Indianapolis City Hospital; connected with the medical department of Eli Lilly and Company; aged 43; died, Dec. 5, 1935, of urinary calculi with infection and myocarditis.

George Washington McCaskey, Fort Wayne, Ind.; Jefferson Medical College of Philadelphia, 1877; professor emeritus of medicine, Indiana University School of Medicine; member and past president of the Indiana State Medical Association; member of the American Gastro-Enterological Association; fellow of the American College of Physicians; past president of the Northern Tri-State Medical Association; aged 82; died, Dec. 30, 1935, of cerebral hemorrhage and cerebral arteriosclerosis.

Robert Berrien Ridley, Atlanta, Ga.; Atlanta College of Physicians and Surgeons, 1902; member of the Medical Association of Georgia; past president of the Fulton County Medical Society; fellow of the American College of Surgeons; served during the World War; at various times on the staffs of the Georgia Baptist, Wesley Memorial, Piedmont, Crawford W. Long Memorial hospitals and St. Joseph Infirmary; aged 56; died, Dec. 4, 1935, of heart disease.

Leopold Schiller ● Milwaukee; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1882; associate clinical professor of dermatology, Marquette University School of Medicine; formerly connected with the city health department; at one time medical director and superintendent of the South View Hospital; aged 74; on the staff of the Milwaukee Hospital, where he died, Dec. 10, 1935, of cardiovascular renal disease.

Abraham Hardesty Gorrell ● Zanesville, Ohio; Ohio Medical University, Columbus, 1902; past president of the Muskingum County Academy of Medicine; formerly mayor of Zanesville and county coroner; aged 60; on the staff of the Bethesda Hospital, where he died, Nov. 24, 1935, of a self-inflicted bullet wound.

John Sater Nixon ● Indianapolis; Indiana University School of Medicine, Indianapolis, 1912; member of the Associated Anesthetists of the United States and Canada; aged 48; on the staffs of the City Hospital, St. Vincent's Hospital and the Methodist Hospital, where he died, Dec. 4, 1935, of pulmonary tuberculosis.

Edgar Tolman Ponder, Little Rock, Ark.; Washington University School of Medicine, St. Louis, 1901; professor of clinical neurology, University of Arkansas School of Medicine; member of the Arkansas Medical Society; for many years associated with the Veterans' Administration; aged 56; died, Dec. 7, 1935, of pneumonia.

Jesse Harper Lander ● Victoria, Texas; Southwestern University Medical College, Dallas, 1910; past president and secretary of the Bee County Medical Society, and the Victoria-Calhoun Counties Medical Society; served during the World War; president of the Victoria Hospital; aged 51; died, Oct. 19, 1935.

Charles G. Loose, Reading, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1868; member of the Medical Society of the State of Pennsylvania; aged 89; at various times on the staffs of St. Joseph's Hospital and the Reading Hospital, where he died, Dec. 7, 1935, of arteriosclerosis.

Helmer Andrew Hendrickson ● Edgewater, N. J.; Harvard University Medical School, Boston, 1930; member of the Medical Society of the State of New York; aged 33; died, Dec. 24, 1935, in the New York Post Graduate Hospital, of acute suppurative pancreatitis, acute cholecystitis and bronchopneumonia.

Eli Burton Hamel ● Hastings, Neb.; St. Louis University School of Medicine, 1903; past president and secretary of the Adams County Medical Society; on the staff of the Mary Lanning Memorial Hospital; aged 61; died, Dec. 17, 1935, of coronary thrombosis and hypertension.

Hermann K. Tibbetts, Limerick, Maine; Medical School of Maine, Portland, 1904; for many years member of the school board and chairman of the board of health; aged 58; died, Dec. 21, 1935, in the Henrietta Goodall Hospital, Sanford, of myocarditis and cirrhosis of the liver.

Walter Dixon Price, Brooklyn; Long Island College Hospital, Brooklyn, 1899; member of the Medical Society of the State of New York; aged 63; on the staffs of the Swedish Hospital and the Prospect Heights Hospital, where he died, January 7, of cardiorenal disease.

Joseph K. Frame, Millsboro, Del.; University of Pennsylvania Department of Medicine, Philadelphia, 1888; member and past president of the Medical Society of Delaware; formerly secretary of the Sussex County Medical Society; aged 74; died, Nov. 15, 1935, of angina pectoris.

John Ellis Jennings, St. Louis; University of Pennsylvania Department of Medicine, Philadelphia, 1887; member of the Missouri State Medical Association; fellow of the American College of Surgeons; aged 73; died, Dec. 5, 1935, in the Barnes Hospital, of pneumonia.

Montague Albert Blowers Smith, Halifax, N. S., Canada; University of the City of New York Medical Department, 1883; formerly professor of clinical medicine, Dalhousie University Faculty of Medicine; aged 75; was found dead in bed, Nov. 13, 1935.

Cullen Clarence Conerly, Fisher, La.; Memphis (Tenn.) Hospital Medical College, 1904; member of the Louisiana State Medical Society; aged 56; died, Dec. 1, 1935, in the Highland Sanitarium, Shreveport, of carcinoma of the stomach.

Clayton S. Schwenk, Fort Washington, Pa.; Hahnemann Medical College of Philadelphia, 1882; aged 76; died, Dec. 6, 1935, in the Abington (Pa.) Hospital, as the result of a fall in which a pair of surgeon's scissors pierced his lung.

Louis Fred Reifeis, Colorado Springs, Colo.; Indiana University School of Medicine, Indianapolis, 1920; aged 40; formerly on the staff of the Cragmor Sanatorium, where he died, Nov. 30, 1935, of pulmonary tuberculosis.

Edgar Boston Driskell, Worthville, Ky.; Louisville Medical College, 1907; formerly secretary of the Carroll County Medical Society; aged 54; died, Nov. 30, 1935, of injuries received when struck by an automobile.

Charles S. Philbrick, Bangor, Maine; Hahnemann Medical College of Philadelphia, 1881; member of the Maine Medical Association; aged 80; died, Dec. 10, 1935, of angina pectoris and cerebral hemorrhage.

Ernest Jacob Wichterman ● Masontown, W. Va.; Chicago College of Medicine and Surgery, 1913; served during the World War; aged 52; died, Dec. 20, 1935, in a hospital at Morgantown, of cerebral hemorrhage.

Mary M. Nelsen Hotchkiss, Webster City, Iowa; Hahnemann Medical College and Hospital, Chicago, 1904; member of the Iowa State Medical Society; aged 62; died, Dec. 10, 1935, of cerebral hemorrhage.

James M. Hicks, Huntington, Ind.; Hahnemann Medical College and Hospital, Chicago, 1893; aged 68; died, Dec. 5, 1935, in the Muhlenberg Hospital, Plainfield, N. J., of arteriosclerotic heart disease.

Joseph Davidson Parrar, Philadelphia; Jefferson Medical College of Philadelphia, 1890; served during the World War; aged 67; died, Nov. 12, 1935, in the U. S. Naval Hospital, of chronic nephritis.

Franklin Elisha Babcock, North Dartmouth, Mass.; Jefferson Medical College of Philadelphia, 1890; aged 68; died, Nov. 30, 1935, in Taunton, of bronchopneumonia and carcinoma of the stomach.

Ambrose Roche Ballou, Boston; Baltimore Medical College, 1905; member of the Massachusetts Medical Society; school physician; aged 54; died suddenly, Dec. 4, 1935, of heart disease.

Joshua Melvin Blackwell, Voth, Texas; Tulane University of Louisiana Medical Department, New Orleans, 1900; aged 66; died, in December 1935, in a hospital at Beaumont, of pneumonia.

Howard Luxmoore Carpenter, Santa Paula, Calif.; Stanford University School of Medicine, San Francisco, 1932; aged 29; died, Nov. 24, 1935, of a self inflicted bullet wound.

Calvin Levi Gregory, Redwood City, Calif.; Cincinnati College of Medicine and Surgery, 1874; aged 83; died, Nov. 29, 1935, of arteriosclerosis and cerebral hemorrhage.

Wyman George Hough, Malta, Mont.; Rush Medical College, Chicago, 1919; formerly county health officer and county physician; aged 40; died, Dec. 7, 1935, of uremia.

Florence Mary Dunlap ● Brawley, Calif.; University of Colorado School of Medicine, Denver, 1927; aged 47; died, Nov. 13, 1935, of pneumonia and diphtheria.

John Morgan Johnson, Loving, Texas; Kentucky School of Medicine, Louisville, 1893; aged 66; died Nov. 24, 1935, of chronic myocarditis and bronchial asthma.

William Starling Bradford, Harrisburg, Ark.; Vanderbilt University School of Medicine, Nashville, Tenn., 1884; aged 75; died, Nov. 25, 1935, of heart disease.

David Allen Crosby, Lexington, Ky.; Marion-Sims College of Medicine, St. Louis, 1897; aged 71; died, Dec. 23, 1935, as the result of an automobile accident.

Joseph G. Edie, Nashville, Ga.; National Medical University, Chicago, 1891; aged 82; died, Nov. 18, 1935, of bronchopneumonia and arteriosclerosis.

Edward James Graff, New York; Bellevue Hospital Medical College, New York, 1891; aged 65; died, Dec. 27, 1935, of carcinoma of the colon.

Charles A. Grimes, Bastrop, Texas; Meharry Medical College, Nashville, Tenn., 1894; aged 67; died, Nov. 7, 1935, of cerebral hemorrhage.

Burt J. Maycock, Buffalo; Hahnemann Medical College and Hospital, Chicago, 1886; aged 71; died, Dec. 28, 1935, of pulmonary abscess.

V 100
1936

Correspondence

PROTECTION AGAINST POLIOMYELITIS THROUGH BLOCKADE OF OLFACTORY TRACTS OR BULBS OR THEIR TERMINAL FIBERS

To the Editor:—In the editorial entitled "The Olfactory Tract and Experimental Poliomyelitis" (THE JOURNAL, Dec. 14, 1935, p. 1986) you mention the experiments of Schultz and Gebhardt (*Proc. Soc. Exper. Biol. & Med.* **31**:728 [March] 1934), who sectioned with an electric cautery the olfactory bulb and tract of monkeys for a distance of 2 cm. The animals proved to be immune to a later intranasal instillation of poliomyelitis virus. Confirmatory experiments were recently made by Lennette and Hudson (*Proc. Soc. Exper. Biol. & Med.* **32**:1444 [June] 1930), who found also that, after intravenous injection of virus, normal control monkeys developed poliomyelitis, while monkeys whose olfactory bulb and tract had been sectioned as above remained free from infection.

These experiments seem to show that a mechanical blocking of the olfactory tract or bulb is capable of effectively preventing the virus of poliomyelitis from traveling toward the brain and spinal cord.

The possibility of effecting a purely chemical blockade within the nasal mucosa against the transfer of poliomyelitis virus beyond the nasal structures seems to be indicated by the recent work of Armstrong and Harrison (*Pub. Health Rep.* **50**:725 [May 31] 1935), who were able to protect monkeys against intranasal instillations of virus by preliminary treatment with intranasal alum injections. I would explain these results on the assumption that the alum fixed by the nasal tissues acts as a mordant for any virus that might penetrate the mucosa, fixing the virus and preventing its migration beyond the nasal passages. Sodium tannate has been found to produce similar results by Sabin, Olitsky and Cox. The fact that protection effected by the tanning agents does not last for more than a few weeks speaks for a superficial tanning effect followed by a desquamation.

With relation to the use of this form of chemical blockade in human beings, two thoughts come to mind: One is that after desquamation of the tanned layer the regenerated epithelium might be even more permeable to poliomyelitis virus than the original. The other is that the exposure of the nasal mucous membrane to a denuding agent, such as bile salts—preliminary to or simultaneous with the instillation of tanning agents—might allow the latter to penetrate to a higher cellular level and possibly prolong the protective action exerted by them. This thought is prompted by the work of Besredka, who accomplished the enteric immunization against typhoid by the simultaneous administration of bile and typhoid vaccine.

While it is generally assumed that, for purposes of systemic immunization, killed virus has lost its antigenic power, it is not absolutely excluded that virus bactericidally inactivated before instillation—or virus fixed and inactivated by tanning agents within the nasal mucosa—could not, if it reached a high enough tissue level, produce a local immunity.

It has occurred to me that, in addition to a mechanical and chemical blockade against the extension of virus to the brain, one might possibly achieve a biochemical blockade through photochemical action on the structures of the roof of the nose (Peskind, Samuel: A Suggestion for an Experimental Attempt at Local Immunization in Poliomyelitis Through Irradiation of the Portals of Entry, S. P. Mount & Co., 1932). The terminal fibers of the olfactory nerve piercing the cribriform plate of the ethmoid come to lie just beneath the mucous membrane of the roof of the nose and are thus easily accessible to intranasal treatment, such as irradiation. It has been shown by immunologists (Menkin, Opie and others) that antigens and micro-organisms tend to become fixed in an inflamed tissue (Sherwood: Immunology, St. Louis, C. V. Mosby Company, 1935, p. 73). Irradiation with light from an ultraviolet lamp produces an actinic injury that results in an inflammatory tissue response. There would be some reason to hope therefore, that irradiation of the upper part of the nasal cavity at an appropriate time before or after the instillation of poliomyelitis virus might so alter the tissues in the upper part of the nose as to render them retentive for poliomyelitis virus. The irradiated tissue would thus act as a barrier to the further extension of the virus.

The effect of this biochemical blockade would be enhanced, moreover, by the migration into the irradiated field of large numbers of leukocytes, which, through phagocytic action, would reinforce the fixation process initiated by the irradiation.

The experiment suggested, of irradiating the nose preliminary to or subsequent to the intranasal instillation of poliomyelitis virus, might, if the results should confirm the theory, afford a method of developing a local immunity against poliomyelitis at the portals of entry, thus preventing an extension to the central nervous system.

This communication is written with the hope that some poliomyelitis worker may put the suggestion to the experimental test.

SAMUEL PESKIND, M.D., Cleveland.

WORK ON XANTHINE AND MERCURIAL DIURETICS

To the Editor:—In THE JOURNAL, Sept. 14, 1935, page 887, there appeared an editorial on the action of the xanthine and mercurial diuretics, credit for the fundamental work in this line being given to certain groups of investigators but no mention being made of the concomitant work of Herrmann et al. from the Medical College of the University of Texas, at Galveston. As the articles considered in the editorial all quote the work of the Texas group, it is a little surprising that proper credit is not given them in the editorial. Papers by the Texas group on the glomerular action of the xanthines and the tubular action of the mercurials may be found as follows:

Tr. A. Am. Physicians **47**: 279, 1932; **48**: 364, 1933.
Herrmann, George; Stone, C. T.; Schwab, E. H., and Bondurant, W. W.: Diuresis in Patients with Congestive Heart Failure, THE JOURNAL, Nov. 12, 1932, p. 1647.
Herrmann, George; Schwab, E. H.; Stone, C. T., and Marr, W. L.: Advantage of Alternating Vegetable and Metallic Diuretics in Treatment of Edema of Congestive Heart Failure, *J. Lab. & Clin. Med.* **18**: 902 (June) 1933.

GEORGE M. DECHERD, M.D., Austin, Texas.

"SOCIAL SCIENTISTS IN THE MEDICAL FIELD"

To the Editor:—I am greatly pleased with the editorial in the January 11 issue of THE JOURNAL entitled "Social Scientists in the Medical Field." In support of your editorial I may say that during the past week I endeavored to make use of data in a paper by Selwyn D. Collins, Ph.D. (*Am. J. Pub. Health* **25**:1221 [Nov.] 1935). When I came to analyze the data I found that the word "immunization" as employed by the author is altogether different from that employed by immunologists.

In figure 2 are listed the "annual immunizations against various diseases." Included in the list of immunizations are the Schick test, the Dick test and treatments of hay fever and of poison ivy and oak. The tests merely reveal the presence or absence of immunity, while the hay fever and the poison ivy treatments do not confer immunity.

The phraseology used in the text of the paper is incorrect in many respects; for instance, "inoculation against hay fever," "antitetanic vaccination," "immunizing inoculations in hay fever" and "immunizing extracts in hay fever."

Summary 2 has no foundation, since the statement appears to be based on the number of persons immunized with toxin-antitoxin mixture or with diphtheria toxoid, on the number of persons passively immunized with diphtheria antitoxin, on the number of persons given the Schick test.

Collins lists six earlier papers which he has written on the results obtained in the study, in which the "8,758 white families surveyed lived in 130 localities in eighteen states." If each of the other six papers is on a par with the one I have been trying to read, I am inclined to think that those who are paying for these studies are receiving information that is confusing because of the use of terms that are not acceptable to immunologists.

D. H. Bergey, M.D., Philadelphia.

Queries and Minor Notes

Anonymous Communications and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted on request.

TESTS USED IN STUDYING HYPERTENSIVE DISEASE

To the Editor:—In Queries and Minor Notes in The Journal, Nov. 30, 1935, page 1793, "Hypertensive Disease," you list (1) the amyl nitrite test (Stieglitz, E. J.: Arterial Hypertension, *Arch. Int. Med.* 46:227 [Aug.] 1930; *Illinois M. J.* 62:414 [Nov.] 1932); (2) renal functional tests; (a) concentration test (Fishberg); (b) diuresis—concentration test (Mosenthal); (c) urea clearance test; (d) sodium ferrocyanide test of glomerular efficiency (The Journal, Dec. 8, 1934, p. 1760). Could you publish in brief these tests at some future date? Kindly omit name.

M.D., New Jersey.

Answer.—The purpose of the amyl nitrite test is to determine the relaxability of the arteriolar walls in hypertensive arterial disease and thus inversely evaluate the degree of arteriolarsclerosis. It is of no therapeutic value. Quickly acting vasodilator drugs will cause a rapid and profound fall in the arterial tension when the hypertension is due to hypertonia of the arteriolar musculature, but nothing relaxes sclerotic vessels temporarily or permanently.

The technic of the test is simple. With the patient in a comfortable, relaxed position, either lying or sitting, the arterial tension is determined. The patient then inhales deeply two or three times of a pearl of amyl nitrite while the arterial tension is measured quickly and repeatedly. The pressure falls rapidly, usually reaching the minimum level in from thirty to fifty seconds. It then rises again, but not quite as quickly. The minimum level is reached just before the intense facial flush appears. As the significant observation is the minimum diastolic tension, it is essential that the readings be made as swiftly as possible or else the minimum level will be missed. Thus it may be desirable to disregard the systolic tension and follow the diastolic tension exclusively.

Interpretation is the most important phase of any test. The approach of the diastolic tension toward, to or below the normal level constitutes the significant observation. For example, three patients, A, B and C, all of about the same age and with similar degrees of hypertension (220/130 for purposes of comparison), respond quite differently to the amyl nitrite test: A reveals a minimum diastolic tension of 110, B one of 100 and C one of 80 mm. As 90 mm. is the maximum normal diastolic tension, the original abnormality of 40 mm. is halved in the case of A and reduced 75 per cent and 100+ per cent in the cases of B and C. The degree of arteriolarsclerosis may be considered as just the reverse of these figures. It is now seen that the prognosis for these three men has become dissimilar; little or nothing can be accomplished for the extensive arteriolarsclerosis of the first case, whereas the last case shows so little sclerosis that, with proper and effectively prolonged therapeutics, one may hope to accomplish much.

The concentration test of renal function is based on the knowledge that concentration of the urine requires much work on the part of the kidneys. Thus, deprivation of water creates conditions requiring increased renal effort, and it is always under conditions of stress that inherent weaknesses become manifest. There are many modifications of the concentration test (originally introduced by Volhard), but that suggested by Fishberg is the most practical for routine use: No fluids or food are consumed from supper time until 10 a. m. the next morning. The first voiding of urine on arising is discarded, but thereafter separate urine specimens are collected at 8, 9 and 10 a. m. The specific gravity of these are determined at room temperature. In the normal person the maximum specific gravity of these specimens will be 1.025 or more; the degree of failure to concentrate to such an extent may be considered a measure of the degree of renal functional impairment.

The test is physiologically sound, practical and simple and has proved to be especially valuable in detecting early impairment of the renal reserve. It is a procedure applicable to office routine. The major source of error is a diuresis due to subsiding edema, which lowers the specific gravity despite the fact that no water is taken by mouth. The test should not be carried out under such conditions.

The Mosenthal, or two hour, test has been repeatedly described in standard textbooks. Briefly, it consists in a thirty-six hour period of controlled fluid intake with urine specimens collected at stated periods in the final twenty-four hours. The actual period of observation starts at 8 a. m. Fluid is taken at 8 a. m., 12 noon and 6 p. m., exactly 600 cc. being consumed with each meal. At 10 a. m., 12 noon and 2, 4, 6 and 8 p. m. complete specimens of urine are collected and then a twelve hour specimen from 8 p. m. to 8 o'clock the next morning. The volume and specific gravity of each specimen are determined. Thus one may observe the promptness with which diuresis occurs following water ingestion, the extent of such diuresis and the ability of the kidneys to concentrate the urine as revealed by fluctuations in the specific gravity.

The specific gravity should vary at least 0.010 in the various samples and normally the night urine volume is about one third of that secreted during the day. Originally Mosenthal used an exact quantitative diet for several days prior to the test and measured the nitrogen excretion. The latter data, however, added little information of truly clinical value. The procedure is more cumbersome than the concentration test. Unless the specimens of urine are accurately collected the test is valueless, for the changes in volume output are most important.

In the opinion of Van Slyke and many others the blood urea clearance is the most sensitive indicator of the state of renal function. By the blood urea clearance is meant the cubic centimeters of blood cleared of urea by the kidneys per minute. Because the volume of urine influences the clearance, this factor must be given consideration. The standard formula employed is

$$\text{Standard Blood Urea Clearance} = \frac{U}{B}\sqrt{V}$$

in which U is the concentration of urea in the urine, B the urea concentration in the blood and V the volume of urine in cubic centimeters per minute. The normal clearance is about 54 cc. per minute for adults. It is claimed that urea clearance may fall to 40 per cent of the normal in nephritis before the phenolsulfonphthalein test reveals impairment and/or before a significant elevation of creatinine or urea occurs in the blood.

The sodium ferrocyanide test of glomerular efficiency is still in the experimental stage of clinical elevation. It is based on the demonstration that ferrocyanide salts are secreted solely through the glomeruli. The procedure offers promise but requires some special quantitative reagents. A full description of the technic of the test appears in the reference cited in the query; it does not warrant reiteration here.

TOXICITY OF HEXACHLORETHANE AND CHLORINATED RETENE

To the Editor:—Recent research has thrown much light on the value of hexachlorethane and chlorinated retene in oils used as metal cutting fluids. I am anxious to use these materials in place of sulfurized oils, provided there is no health hazard attached to them. Can you advise me regarding their toxicity, volatility and odor? The cutting fluid consists of 10 per cent hexachlorethane and 90 per cent mineral oil or 10 per cent chlorinated retene and 90 per cent mineral oil.

Charles Rubin Jr., Chemist, Newport, R. I.

Answer.—Extensive exact information on the toxicity of either hexachlorethane or chlorinated retene is meager. The guarded statements that follow are predicated on chemical similarity to other substances the toxicities of which are better known. Quite apart from the presence of either in cutting oils, a dermatitis is likely to arise from a variety of causes, including the abrading action of minute particles of metal, the plugging up or sealing over of the orifices of the skin, the irritant action of decomposed mineral oils after long use, or the presence of bacteria in the cutting compounds.

V 10
1936

Hexachlorethane (C_2Cl_6) is a solid material possessing a camphor-like odor. This substance has been used in ointments for the skin as an analgesic and internally in such doses as from 0.25 to 0.5 Gm. The boiling point of this compound is near 185 C. If vapors were produced it is believed that their action would be similar to those of chloroform and of carbon tetrachloride and thus distinctly toxic. Used in cutting compounds it is reasoned, rather than proved, that injurious action, if any, would be limited to the causation of an increased incidence of skin disorders. The internal use of this substance in veterinary medicine has disclosed evidences of marked gastro-intestinal and renal irritation. Retene (methyl-isopropyl-phenanthrene, $C_{18}H_{18}$) has a boiling point of about 390 C. This substance is primarily obtained from wood tar but may be obtained in the higher fractions of coal tar near anthracene. Thus it lies in the fractionation range that is known to harbor carcinogenic agents. Most of the phenanthrene compounds are distinctly toxic for animals. Many of these compounds act as analgesic, depressant and emetic agents. The high boiling point of this substance should eliminate the prospect of injury from inhaled vapors in connection with use in cutting compounds, but the occurrence of skin irritation remains as a possibility. At this time the protective use of these substances, from the point of view of toxicity, cannot be praised or condemned, owing to the lack of sufficient information. Before practical application to industry on any large scale, suitable investigative work should be instituted to establish the absence of opportunities for injury to workmen.

LOCALIZED SWELLINGS AFTER PELVIC OPERATION

To the Editor:—I have a patient about 35 years of age, a woman, Mexican, on whom about nine months ago a pelvic operation was performed by another surgeon here. The tubes and appendix were removed. About three months ago she complained of a swelling of her right arm, breast and leg. The swelling is not painful but when she has worked all day she states that there is numbness, especially in the right arm. The difference in size of the right arm and breast are now quite noticeable. There is no pitting of the skin, and the arm is equal in color and warmth to that of the left arm. Roentgen examination shows no evidence of a cervical rib. The Wassermann reaction is negative. The heart and lungs are normal. She has lost no weight and feels well except for the numbness in the right arm, which comes on about evening. The case has rather puzzled me from a diagnostic standpoint. I would appreciate suggestions for treatment.

O. J. HANSEN, M.D., Redding, Calif.

ANSWER.—Ordinarily there is no connection between a pelvic operation and edema of an arm, breast and leg. However, if for some reason a premature menopause is induced as the result of a pelvic operation, swellings such as described in this case may be observed. Local adiposities, especially of the arms, are not rare even in the natural menopause. The cause is a disturbance in one or more of the endocrine glands and perhaps also a dysfunction of the vegetative nervous system. Since the etiology of such edemas is not definitely known, treatment cannot be specific. Maranon (The Climacteric, St. Louis, C. V. Mosby Company, 1929, p. 346) obtained quick relief in one case by administering thyroid, hypophyseal and ovarian therapy.

FACTORS MODIFYING BONY UNION

To the Editor:—1. Does age, debilitating disease or syphilis interfere with bony union? 2. Is there an increasing belief that all types of extension in the treatment of long bone fractures tend toward joint involvements, ankylosis and general stiffening of the member? 3. Has experience justified the use of noncorroding pins through bones to aid extension? What is the trend?

E. O. HARBOLD, M.D., Marion, Ind.

ANSWER.—1. Bony union occurs more slowly in people of advanced age or in the presence of debilitating disease. The influence of syphilis on the healing of fractures has not been definitely established. In almost all cases of syphilis, fractures unite as rapidly as in normal persons of equal age.

2. Extension in the treatment of fractures of the long bones does not produce ankylosis or joint involvement. It does, however, tend to lessen the flexibility of the capsule of the joint, if continued for a long time, especially in adults. The muscles also tend to become stiffened and atrophied by disuse, thereby limiting, at least temporarily, the motion in the joints. It is therefore of great importance to provide for motion in the joints whenever this can be done, during the healing of the fracture. Massage and active contraction and relaxation of the muscles will be of distinct benefit.

3. In cases in which sufficient traction cannot be obtained by adhesive plaster or by Heusner's or Sinclair's glue, skeletal traction by Steinman's nail or Kirschner's wire is satisfactory and reasonably safe. It requires constant supervision and complete surgical cleanliness but allows the use of heavier traction with less discomfort. The trend is distinctly toward skeletal traction, especially when injury to the skin and soft tissues makes skin traction difficult or when very heavy weights are necessary for proper reduction of the fracture.

TRICHLOROETHYLENE IN ANGINA PECTORIS

To the Editor:—Reports appearing in the Associated Press news Dec. 30, 1935, indicated that trichloroethylene was of permanent effect in the treatment of angina pectoris. Was this statement correct?

M.D., Chicago.

ANSWER.—The report referred to contained the following statement:

Instantaneous relief for the pain of angina pectoris and complete cure for most sufferers from the disease was claimed today by Dr. John C. Krantz Jr. of the University of Maryland in a report which he read to the American Association for the Advancement of Science.

The cure, he said, is a drug called trichloroethylene, one cubic centimeter of which is snuffed into the nose when the pains and heart compression of angina pectoris begin. It gives relief within one second.

Used to date on twenty human patients, Dr. Krantz said it had given permanent relief to eighteen of them. He explained that these eighteen were apparently completely cured with no other treatment. The other two cases failed to benefit, he said.

Dr. Krantz is professor of pharmacy in the medical college of the University of Maryland.

Joining him in the report were C. Jeleff Carr, Ruth Musser and William Harne of the University of Maryland.

The treatment, Dr. Krantz said, is still somewhat mysterious in its mechanism, but it apparently acts to clear obstructions in the coronary blood vessels which feed the heart. In angina pectoris, he explained, these coronary vessels "lose tone" and decrease the supply of oxygen being carried to the heart in blood pumped to it.

An inquiry was sent to John C. Krantz Jr., Ph.D., professor of pharmacology at the University of Maryland School of Medicine. Dr. Krantz replied as follows:

My associates and I reported at the Section of Medical Sciences of the American Association for the Advancement of Science the mechanism of the action of trichloroethylene in the treatment of angina pectoris, which was studied clinically in the institution by Dr. William Love Jr. The accounts of our pharmacological studies appear in the following journals: *J. Pharmacol. & Exper. Therap.* **54**: 327, 1935; *Proc. Soc. Exper. Biol. & Med.* **33**: 334, 1934; *J. Am. Pharm. A.* **24**: 754, 1935; *Arch. internat. de pharmacodynamie et de therapie*, in press.

It is unfortunate that the Associated Press misinterpreted the presentation and stated that we had discovered a cure for the disease. Dr. Love's patients were relieved in most cases from the distress and apprehension of angina pectoris by the inhalation of 1 cc. of the drug, morning and evening.

I shall be pleased if you will emphasize to those who inquire from you the fact that we have not discovered a cure for angina pectoris.

It may be pointed out that trichloroethylene is a drug to be prescribed with caution.

HYPERTHYROIDISM AND ENDOCARDITIS

To the Editor:—Some years ago a patient was given radium to control menorrhagia. Following this, enlargement of the thyroid gland was noted. Radium was again used on this gland, resulting in a severe reaction. Following this, toxic symptoms developed. Operation for goiter was advised but refused. Another physician was consulted and alternate monthly treatments with iodine and cod liver oil brought marked improvement and gain in weight. No return of symptoms occurred for several years. At present the patient is under my care and complains of stiffness and pain in the hands, arms and legs, loss of weight, nervousness, insomnia, excessive perspiration and fever. The patient is now 43 and has a markedly irregular heart, definite enlargement of the thyroid gland, and swelling of the small joints of both hands. The temperature ranges from 99 to 102 F. The pulse is from 80 to 110 (irregular). The basal metabolic rate is +45. The blood count reveals 10,000 leukocytes, 20 per cent lymphocytes, 80 per cent polymorphonuclears and hemoglobin 80 per cent. Urinalysis reveals albumin 1+ and is otherwise negative. Treatment has consisted of complete rest in bed, compound solution of iodine, digitalis, sedatives at night, a high carbohydrate diet, and codeine and aminopyrine as needed. I would appreciate suggestions regarding further treatment, with particular reference to use of x-rays, with dosage, time of administration, and so on. Would cardiac irregularity and rheumatic pain contraindicate the use of roentgen treatment?

M.D., New Jersey.

ANSWER.—The presence of a persistent daily fever to 102 F. and arthritic symptoms would strongly suggest not hyperthyroidism alone but also endocarditis. Definite recession of the metabolic rate and clinical improvement during the first two or three weeks of iodine administration would speak strongly for hyperthyroidism and, if this is true, a thyroidectomy should be advised. The unfortunate reaction to irradiation of the thyroid in the previous thyrotoxicosis suggests that it would be unwise to use it again, while the cardiac irregularity does not contraindicate surgical intervention.

EPILEPSY WITH PSYCHIC ELEMENT

To the Editor:—An epileptic woman has been suffering with the attacks for ten years. She is married and had a premature labor seven years ago (about the seventh month) and she had already tried all types of treatments advised by her physicians, but without any results. Examination of the blood revealed a negative Wassermann reaction, a positive Kahn reaction, urea and sugar normal, the urine normal except for a slight trace of albumin, the genital organs normal except for tenderness on the right ovary, which the patient says is almost continuous. The curious thing about her attacks is that they come on always after intercourse with her husband and she remembers that the first attack was after a menorrhagia (probably an early abortion). After a condom was used to eliminate seminal absorption as a cause, the attack repeated on the next night, for they are nocturnal attacks coming about 6 to 8 p. m. and are almost continuous; sometimes the attack is repeated from three to six times. She goes to sleep only with the help of morphine. After the attack she is in a state of semihallucination for a day or two. What is the relation of sexual intercourse to the attack? Is there any hypersecretion or hyposecretion of ovarian hormones here or a simple irritation? What treatment is recommended (she is using now a bismuth compound and iodine)? Is ovariectomy indicated in these cases, without any tumor; and if there was a tumor, would operation relieve the state? Kindly give an outline of causes and treatment of epilepsy. Please omit name and address.

M.D., Brazil.

ANSWER.—The patient's age has not been stated but it is taken for granted that she is relatively young. The ovarian tenderness probably has no relation to the attacks and there is no indication in the clinical history that any ovarian disturbance exists. Ovariectomy is not at all indicated.

The fact that these attacks always come on after intercourse with her husband suggests that this is a form of epilepsy which has a large psychologic factor in its etiology. The indicated treatment is based on the unearthing of the probable causative factors. The use of phenobarbital, which is usually recommended in increasing doses for cases of epilepsy in which the constitutional factors predominate, is not indicated in this case at the present time. A careful psychiatric study is the first procedure to institute.

DANGER OF NEEDLE PRICK DURING OPERATION ON SYPHILITIC PATIENT

To the Editor:—While performing an abdominal operation I inadvertently pricked my left index finger with a needle at its distal end on the palmar surface. The fact that the patient has a 4 plus Wassermann reaction has a bearing on the seriousness of this unfortunate accident. However, the records reveal that the patient was admitted to Sing Sing prison Dec. 30, 1933. The Wassermann report at that time was 4 plus. He received five injections of a bismuth compound of 2 cc. each, two injections of neoarsphenamine of 0.45 Gm., and three injections of neoarsphenamine of 0.6 Gm. each. He was transferred to the institution for male defectives June 2, 1934. The Wassermann report was 4 plus. During his residence here he received ten injections of sulfarsphenamine of 0.3 Gm., each, thirty-five injections of a bismuth compound of 0.1 Gm. each, and the last treatment was given on April 29. The Wassermann reaction was 4 plus, April 22. The site of the needle prick never bled and shows only slight sensitivity. A thorough examination of the inside of the glove revealed no evidence of blood. Soon after the accident 33 per cent ointment of mild mercurous chloride was thoroughly rubbed in at the site of the puncture. For the present I shall endeavor to check up the patient's blood and spinal fluid Wassermann reactions and within three weeks I shall check up my own blood and continue to do so the following several weeks and then once a month for a full year. I hope though that the "break" will be in my favor. I will greatly appreciate your advice as to treatment.

M.D., New York.

ANSWER.—The danger of infection under the circumstances outlined is practically nil. The patient in question has had syphilis at least two years and has received fifteen injections of an arsenical drug and forty injections of a bismuth compound. The only practical danger of accidental infection by a needle prick is from a patient with untreated early syphilis or from an individual with obvious signs of infectious mucocutaneous relapse. A needle prick involving blood from a patient who has had syphilis more than four years, whether treated or untreated, need not be feared. For the sake of the correspondent's peace of mind, a Wassermann follow up might be carried out at intervals of every two weeks for a maximum period of four months. It is not necessary to continue such a follow up for one year. No antisyphilitic treatment is indicated. Proper prophylaxis under these conditions involves immediate laying open of the wound to the approximate depth of the needle prick and packing with 33 per cent ointment of mild mercurous chloride, which is left in situ for twenty-four hours. The prophylactic use of arsphenamine is to be avoided, since its efficacy is not proved and since it may only suppress the lesions of syphilis rather than prevent infection.

The present status of the patient's blood and spinal fluid serologic reactions has no bearing on his potential infectiousness, which, instead, depends entirely on the duration of the disease in him.

MENINGOMYELITIS

To the Editor:—A Filipino woman, aged 45, a decimpara, had fever of two weeks' duration over two months ago, followed by paralysis and loss of sensation of both lower extremities and inability to urinate and defecate voluntarily. The paralysis and loss of sensation gradually ascended to the neck, including the upper extremities. The blood Wasserman reaction was negative. Roentgen examination of the spinal column showed nothing pathologic. I am undoubtedly dealing with a case of diffuse myelitis of the ascending type. My treatment is purely symptomatic, consisting of systematic catheterization, urinary antiseptics, prevention of bedsores, strychnine, potassium iodide, massage and faradization. The progress of the lesion seems to have stopped, as the patient regained some of the power of her left arm. Kindly advise me as to the best method of treatment in this case. Do you think that the patient will fully recover? If so, after how long? An x-ray specialist promised to cure her but because of her physical condition she could not be brought to his office. She used to complain of some heaviness on her chest and difficulty of respiration. These are sometimes relieved by oxygen inhalation and injection of lobeline.

M.D., Philippine Islands.

ANSWER.—This case is probably one of the unusual ascending meningomyelitis types. It is unusual in that the inflammation did not continue to ascend into the medulla oblongata and cause respiratory paralysis and death. A careful manometric study of the spinal fluid should be made to determine the presence of spinal block. If the latter is present an exploratory laminectomy should be performed at the level where the highest or uppermost objective neurologic signs indicate. The prognosis under any circumstance should be guarded. Occasionally this type of patient makes a sufficient amount of recovery to walk again. The time required for such a recovery may be from weeks to months. If laminectomy is not done, the following regimen is suggested: The patient should be on an air or water mattress to prevent decubitus. The urinary bladder should be the object of careful hygiene by the insertion of a permanent catheter under aseptic means. Potassium permanganate or mild protein silver should be instilled into the urinary bladder every third day. A high caloric diet and copious amounts of liquids should be prescribed. The skin of the patient should be kept as dry as is humanly possible. Light massage (daily) should be given to all paralyzed and weak extremities. Galvanic current stimulation should be given involved muscles of the extremities if there is no reaction of degeneration. Medication is usually of little value.

CUTANEOUS REACTION TO GONOCOCCUS FILTRATE

To the Editor:—Today I injected Parke, Davis & Co.'s gonorrheal filtrate (Corbus-Ferry) into three individuals as follows: (1) known to be free from gonorrhea, (2) with suspected but unproved gonorrhea, and (3) known to have gonorrhea. In case 1 the reaction was less than 2 cm. in diameter, while in cases 2 and 3 the reaction exceeded 4 cm. in diameter. Patient 2 is a woman and I am almost certain that she is the source of infection in case 3. Cervical smears have been negative on two occasions. Will you please comment on the interpretation of the reaction and its significance, if any?

PAUL K. JENKINS, M.D., Miami Beach, Fla.

ANSWER.—The correspondent does not state the size of the dose given. Normal persons often give a cutaneous response to intradermal injection of $\frac{2}{100}$ cc. of the bouillon filtrate, even in dilutions as low as 1:1,500. A cutaneous response in the suspected individual and in the infected individual is caused by the local irritation of the toxin in patients allergic to the gonococcus. The cutaneous reaction that follows injection of the standard (Corbus-Ferry) bouillon filtrate cannot be interpreted as a diagnostic test, as it occurs in normal as well as infected individuals.

HEADACHES DUE TO SYPHILIS

To the Editor:—A man, aged 37, white, a huckster, developed severe occipital headaches five weeks ago. The past history is negative except that he thinks he had similar but milder headaches three years ago. The physical examination was negative except for knee reflexes that are somewhat overactive. The Romberg sign is negative. Laboratory examination was negative except for a blood Wassermann reaction of, plain, 2 plus, and cholesterol, 3 plus. The spinal fluid Wassermann reaction was negative. There was increased globulin and increased lymphocytes. The colloidal gold curve was 1233211000. I have diagnosed this as a case of cerebrospinal syphilis. What treatment would you recommend?

M.D., New Jersey.

ANSWER.—If the patient's headaches are due to syphilis, as seems likely although not certain, it is most probably due to a basilar meningitis. This process usually responds favorably to antisyphilitic treatment. One would suggest that the patient be given three or four intramuscular injections of an insoluble salt of bismuth at weekly intervals and then neoarsphenamine intravenously, the dosage varying from an initial one of 0.3

V 106
1936

Gm. to 0.75 Gm. for from eight to ten weeks. For the first five weeks of treatment, ascending doses of sodium iodide by mouth, beginning with 0.65 Gm. three times a day and increasing to 2 Gm., should be given. By the time the course of neoarsphenamine is finished, the patient should be free from symptoms. If not, the case should then be reviewed again for other causes of pain. If nothing else is found, one might then resort to tryparsamide.

SODIUM TAUROCHOLATE—MANNITOL HEXANITRATE

To the Editor:—I am interested in using oleic acid and sodium taurocholate as a cholagogue in a patient who had a cholecystectomy some years ago, but I cannot learn from the literature at hand what should be the dose and what preparation is used. I would appreciate it greatly if you could supply me with this information and some citations to the literature. Also, in the May 25, 1935, issue of THE JOURNAL is mentioned mannitol hexanitrate as a remedy in arterial hypertension. Can you inform me where this drug can be obtained and what is the dose and something of the literature? It is not given in the recent edition of Merck's index.

D. R. BARR, M.D., Grand Rapids, Mich.

ANSWER.—Oleic acid is given in 0.5 cc. capsules, one or two of which are best taken in the morning on an empty stomach.

Sodium taurocholate may be given in doses of 0.12 to 0.4 Gm. in keratin coated pills to prevent solution until it reaches the bowels.

Mannitol hexanitrate is marketed in 0.06 Gm. tablets by W. H. Martindale, 12 New Cavendish Street, London, England. One may begin with one-half tablet three times daily and gradually increase the dose until the desired effect is attained. Information regarding it may be secured from "The Extra Pharmacopoeia" or Martindale and Westcott (H. K. Lewis and Company, London); also the U. S. Dispensatory, edition 21, part II, page 1395. J. B. Bradbury (*Brit. M. J.* 1895, part II) has studied it as a member of a series of nitrated alcohols.

STATISTICAL DATA ON HUMAN SKELETON

To the Editor:—I should like to have references to information on the height and weight of the human skeleton at various ages and for both sexes. Is information available in textbooks or articles giving the percentage of fat, muscle and water in the human body comparable to the analyses by Atwater and others who have tabulated the composition of various foodstuffs to show the percentage composition in protein, fat and water?

HORRY M. JONES, M.D., Chicago.

ANSWER.—The best single source of information concerning statistical measurements of the human body, both anatomic and physiologic, is Vierordt's Tabellen (last edition, Jena, Gustav Fischer, 1906).

The height of the human skeleton is practically the height of the body. This is 50 cm. at birth and as follows at the end of each successive year thereafter, from 1 to 25 years (Liharžik):

56.9	97	133	165
63.7	103	139	167
70.5	109	145	169
77.3	115	151	171
84.2	121	157	173
91	127	163	175

The weight of the skeleton is 305.3 Gm. at birth, 8,390 Gm. at 22 and 11,080 Gm. at 33.

The percentage of fat, muscle and water, as well as the weight of various organs at different stages of development, may be found in Vierordt's Tabellen (pp. 34 to 44, inclusive).

UNILATERAL SWEATING

To the Editor:—In this department of THE JOURNAL, January 11, page 148, the lesions associated with unilateral sweating were enumerated as follows: epidemic (lethargic) encephalitis, lesions of the brain stem and tumors involving the brain stem, and occasionally unilateral frontal lobe lesions. Such a list leaves a distinct impression that asymmetrical perspiration is a symptom of ominous import. It should be pointed out that this symptom by no means implies a permanent menacing lesion in the central nervous system. Asymmetrical perspiration appears not infrequently in migrainic individuals. It is most commonly manifest during the attacks but may rarely appear in the absence of acute symptoms. Localized areas of skin may sweat profusely while neighboring areas are dry. With the hemicranic cephalalgia other asymmetrical phenomena, such as scotomas, are not unusual. Migraine, although often intractable to therapy, is not a menace to life and therefore deserves emphatic inclusion in any list of disturbances associated with asymmetrical sweating.

The mechanism of such unilateral perspiration is unexplained, but one may offer as a tentative suggestion the ill defined but obvious defect in the equilibratory mechanism of the circulatory system which is characteristic of the migraine physique (*Am. J. M. Sc.* **180**:359 [March] 1935).

EDWARD J. STIEGLITZ, M.D., Chicago.

Medical Examinations and Licensure

COMING EXAMINATIONS

ALASKA: Juneau, March 3. Sec., Dr. W. W. Council, Juneau.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Written examination for Group B applicants* will be held in various cities throughout the country, March 14. *Oral examination for Group A and B applicants* will be held in Kansas City, Mo., May 11-12. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Written examination and review of case histories of Group B applicants will be held in various cities of the United States and Canada, March 28. *Applications must be filed not later than February 28.* Oral, clinical and pathological examination of all candidates will be held in Kansas City, Mo., May 11-12. *Applications must be received not later than April 1.* Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF OPHTHALMOLOGY: Kansas City, Mo., May 11 and New York, Sept. 26. *All applications and case reports must be filed sixty days before date of examination.* Asst. Sec., Dr. Thomas D. Allen, 122 S. Michigan Ave., Chicago.

AMERICAN BOARD OF ORTHOPEDIC SURGERY: Kansas City, Mo., May. *Applications should be filed with the secretary before April 15.* Sec., Dr. Fremont A. Chandler, 180 N. Michigan Ave., Chicago.

AMERICAN BOARD OF OTOLARYNGOLOGY: Kansas City, Mo., May 9. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PEDIATRICS: Kansas City, Mo., May 9. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: St. Louis, Mo., May 8-9. Sec., Dr. Walter Freeman, 1028 Connecticut Ave., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: Kansas City, Mo., May 8-10. Sec., Dr. B. R. Kirklin, Mayo Clinic, Rochester, Minn.

ARIZONA: *Basic Science.* Tucson, March 17. Sec., Dr. Robert L. Nugent, Science Hall, University of Arizona, Tucson.

CALIFORNIA: Los Angeles, March 9-12. *Reciprocity.* Los Angeles, March 18. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Regular.* Hartford, March 10-11. *Endorsement.* Hartford, March 24. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Homeopathic.* Derby, March 10. Sec., Dr. J. H. Evans, 1488 Chapel St., New Haven.

IOWA: Des Moines, Feb. 25-27. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

MAINE: Portland, March 10-11. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MASSACHUSETTS: Boston, March 10-12. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413 State House, Boston.

NATIONAL BOARD OF MEDICAL EXAMINERS. *Parts I and II.* Feb. 12-14, May 6-8, June 22-24, and Sept. 14-16. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

NEW HAMPSHIRE: Concord, March 12-13. Sec., Board of Registration in Medicine, Dr. Charles Duncan, State House, Concord.

OREGON: *Basic Science.* Portland, March 21. Sec., Mr. Charles D. Byrne, University of Oregon, Eugene.

PUERTO RICO: San Juan, March 3. Sec., Dr. O. Costa Mandry, Box 536, San Juan.

VERMONT: Burlington, Feb. 12. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

WEST VIRGINIA: Charleston, March 16. State Health Commissioner, Dr. Arthur E. McClue, Charleston.

WYOMING: Cheyenne, Feb. 10-11. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

Florida November Examination

Dr. William M. Rowlett, secretary, State Board of Medical Examiners, reports the examination held in Tampa, Nov. 11-12, 1935. Fifty-seven candidates were examined, 49 of whom passed and 8 failed. The following schools were represented:

School	PASSED Year Grad.	Per Cent.
George Washington University School of Medicine	(1929)	79.7
Georgetown University School of Medicine	(1932)	86.8
Howard University College of Medicine	(1934)	77.9
Emory University School of Medicine	(1930) (1934) 77.8, 81.5	80.3,
University of Georgia School of Medicine	(1933)	78.5, 78.6
Chicago College of Medicine and Surgery	(1915)	75.7
Northwestern University Medical School	(1933)	84.1
University of Illinois College of Medicine	(1917) 79.5, (1932)	90.6
Tulane University of Louisiana School of Medicine	(1931) 87.1, (1933) 80.5, 81.2, 83.1	75,
Johns Hopkins University School of Medicine	(1922) (1931) 84.6, (1933) 87.5	79.4,
Harvard University Medical School	(1929)	84.4, (1930) 79
Detroit College of Medicine and Surgery	(1927)	76.1
University of Minnesota Medical School	(1930)	83.6
Barnes Medical College, Missouri	(1893)	77.9
St. Louis University School of Medicine	(1933)	80.9
Creighton University School of Medicine	(1932)	78.2
Cornell University Medical College	(1905) 77.3, (1923)	84.2
New York Medical College and Hospital for Women	(1911)	75.5
Syracuse University College of Medicine	(1916)	79.7
Duke University School of Medicine	(1932)	79.8
Medical College of Ohio	(1906)	75
University of Cincinnati Col. of Medicine	(1934) 87.2, (1935)	85.7*
Western Reserve University School of Medicine	(1928)	84.4
University of Oklahoma School of Medicine	(1935)	85.4
Jefferson Medical College of Philadelphia	(1928) (1931) 86.1	90.7,
Temple University School of Medicine	(1933)	76.8
University of Pittsburgh School of Medicine	(1935)	88.2
University of Tennessee College of Medicine	(1926) (1932) 79.9, (1935) 79.7	81.2,
Vanderbilt University School of Medicine	(1915)	75.4

University of Toronto Faculty of Medicine	(1927)	86.6
McGill University Faculty of Medicine	(1897)	83.3
Universidad de la Habana Facultad de Medicina y Farmacia	(1928)	81.7

School	FAILED	Year Grad.	Per Cent
Howard University College of Medicine		(1934)	72.1
Emory University School of Medicine		(1934)	70.9
Baltimore Medical College		(1903)	65.8
Bellevue Hospital Medical College		(1894)	69.6
University of the City of New York Medical Department		(1891)	69.6
Memphis Hospital Medical College		(1901)	69.6
University of Tennessee College of Medicine		(1928)	73.8
Vanderbilt University School of Medicine		(1910)	71.6

* This applicant has received an M.B. degree and will receive his M.D. degree on completion of internship.

Mississippi Reciprocity Report

Dr. R. N. Whitfield, assistant secretary, Mississippi State Board of Health, reports 6 physicians licensed at the meeting held in Jackson, Dec. 5, 1935. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Birmingham Medical College		(1914)	Alabama
Northwestern University Medical School		(1892)	Illinois
University of Louisville Medical Department		(1911)	Kentucky
University of Tennessee College of Medicine		(1934)	Louisiana
Vanderbilt University School of Medicine		(1931)	Tennessee
Medical College of Virginia		(1931)	N. Carolina

Social Medicine and Medical Economics

SYPHILIS IN PREGNANCY

Report of a Study

MAX J. EXNER, M.D.
NEW YORK

While the congenital form of syphilis presents the most tragic and destructive aspect of the disease and the one most resistant to treatment, it is now well known that it is in many ways the most easily preventable. An abundance of experience has shown that if the syphilitic pregnant woman can be brought under modern treatment early in pregnancy and treatment continued through pregnancy, the transmission of the disease to the child can be prevented in almost all cases; that in women brought under treatment by the middle of pregnancy about 95 per cent of the offspring will be protected, and that even treatment begun any time after the middle of pregnancy still serves to protect a surprising proportion of children from infection before birth. The fact that, by timely treatment of the syphilitic pregnant woman, one can with reasonable certainty assure the birth of healthy children from mothers still syphilitic is surely one of the most striking achievements of preventive medicine. If the means of prevention in the physician's hands could be generally applied, congenital syphilis could be quickly eradicated.

The crux of the matter lies in early diagnosis and treatment. Clinical evidence alone is extremely unreliable, since during most of the course of syphilis no clinical evidence of its presence appears, and this is particularly true in pregnancy because pregnancy itself tends to repress clinical manifestations. A very large measure of reliance for diagnosis, however, may be placed in serologic tests. While it is true that in a small proportion of cases in which the blood test is negative the mother may infect the child, repeated blood tests, made on suspicion of the disease, will reveal most of these cases also.

The virtual eradication of congenital syphilis becomes possible by making a blood test early on every pregnant woman and bringing the positive cases under early treatment. As a measure of progress toward this desired end the question becomes important as to how generally the blood test has been adopted as a routine procedure in obstetric practice.

For several years fairly reliable and impressive data have been available as to the prevalence of syphilis among women who attend public clinics but almost no data as to its occurrence among women in private obstetric practice. The American Social Hygiene Association undertook to secure data as to the use of blood tests for syphilis and subsequent treatment both among antepartum clinics and in the private practice of obstetricians.

SEROLOGIC TESTS IN ANTEPARTUM CLINICS

A questionnaire was sent to representative antepartum clinics in all parts of the United States. Replies giving data requested were received from 268 clinics. The questions and a digest of the replies to them are presented herewith.

QUESTION 1. How many antepartum cases were registered for care in your clinic in 1934?

The clinics were requested so far as possible to make report for a period of three or four years; hence some report for one year only, others for two to four years. The total number of antepartum cases included in the study was 219,659.

QUESTION 2. Do you make a blood test for syphilis as a routine in all antepartum cases? If not, what is your practice in the matter?

Of the 268 clinics, 250 (93 per cent) report making blood tests as a routine procedure, and eighteen clinics not as a routine but only on "indication." This presents a very encouraging outlook so far as antepartum clinics are concerned. Rapid progress has been made in very recent years in the adoption of the practice of making blood tests as a routine. A large number of clinics report having begun this practice within the past two years. The progress made in this matter is suggested by comparison with a study of antepartum clinics made in 1925 by a committee of the Medical Women's National Association in cooperation with the American Social Hygiene Association, in which only 42 per cent of thirty-seven clinics scattered throughout the United States reported making blood tests for syphilis as a routine, as compared to 93 per cent in the present study. It can be said that no antepartum clinic can any longer be looked on as being in line with modern ideas and practice which fails to make blood tests as a routine on all pregnant women who attend.

QUESTION 3. In your antepartum clinic, what proportion of cases have been found syphilitic, (*a*) white, (*b*) Negro?

A report for a number of years would be appreciated.

Unfortunately a large proportion of the clinics failed to indicate whether the report was for white or for Negro patients or both. A surprisingly large number stated that no distinction as to race is made in their records.

Seventy-four of the clinics indicate that they report for white patients only. These embrace a total of 62,516 patients. Of these 3,783 were found positive, this being about 6 per cent.

Only eleven clinics indicate they are reporting for Negro patients only. These include a total of 1,708 cases, of which 308, or 18 per cent, are reported positive. This means that among Negro cases in this group, three times as many were found syphilitic as among white patients.

Fifty-nine clinics state that they are reporting for both white and Negro patients but do not give the respective numbers. These embrace a total of 44,855 cases. Of these, 2,460, or 5.5 per cent, were found positive. This comparatively low rate is doubtless accounted for by the fact that in most of these clinics only a very small proportion of Negro cases are included; hence the positive percentage approaches so nearly that of the white group reported.

Sixty-four of the clinics report the respective percentages of white and Negro positive cases without giving the numbers from which the percentages are derived. This enables us to make the sample comparisons of syphilis rates among white and Negro patients given in table 1.

V 100
1936

In only 2 per cent of clinics is the white syphilis rate over 12 per cent, whereas for Negroes the syphilis rate is more than 12 per cent in 48 per cent of the clinics. In 89 per cent of the clinics the syphilis rate for white patients is not over 5 per cent.

QUESTION 4. If possible, please report what proportion of women came to the clinic before the middle of pregnancy, and how many after.

One hundred and forty-two clinics report on this question. The results are given in table 2.

TABLE 1.—*Syphilis Rates Among White and Negro Patients*

	Per Cent Positive	
	White	Negro
1 clinic	4.0	16.0
1 clinic	6.0	9.5
1 clinic	3.0	7.0
1 clinic	2.9	13.8
1 clinic	1.4	6.3
1 clinic	2.0	8.2
1 clinic	2.2	13.0
1 clinic	4.0	6.0
1 clinic	2.4	16.0
1 clinic	1.2	7.0
1 clinic	1.5	2.7
1 clinic	2.7	14.0
1 clinic	0.9	11.0
1 clinic	1.0	11.0
1 clinic	4.0	21.6
1 clinic	0.8	3.5
1 clinic	1.0	10.0
1 clinic	1.0	2.0
1 clinic	1.2	7.0
1 clinic	3.6	17.0
1 clinic	4.0	11.4
1 clinic	2.5	28.0

This question is important in view of the urgency that syphilitic pregnant women come under treatment not later than the middle of the period of pregnancy. It is encouraging to note that, of the 142 clinics reporting on this question, sixty-two, or 44 per cent, are able to report that 50 per cent or more of the patients register by the middle of pregnancy. At the same time it shows how far we still are from our ultimate goal in this matter. It calls for more and more persistent education of the general public, especially the women, to secure their needed cooperation in this aspect of public health.

QUESTION 5. Are syphilitic pregnant women treated for the disease in antepartum clinic? If not, where?

Of the 176 clinics that answer this question, only nineteen state that treatment is given in the antepartum clinic. The most frequently mentioned sources of treatment are the syphilis clinic, venereal disease clinic, genito-urinary clinic, dermatology clinic and medical clinic.

While this situation is doubtless to be expected in large measure, it is important to point out the great need of thorough cooperation and coordination of the service of the antepartum clinic and the sources to which patients are referred for treatment. Various studies have shown the very serious confusion, loss of precious time and failure to get patients under treatment at all because of inadequacy or breakdown in these interrelated services. Unquestionably the most effective plan is to give treatment for syphilis in pregnant women in the antepartum clinic which they attend.

QUESTION 6. If you can give data as to the percentage of cases in which treatment of the woman proved protective for the child, based on a given period of observation and serologic tests, it will be of great value.

The questionnaire returns as a whole, and the answers to this last question in particular, reveal an astonishing lack of system and thoroughness in the recording of data and in studying and analyzing the results of treatment. In a very large proportion of the clinics no racial distinction in the records is made, no records of the percentage of cases positive for syphilis, no accurate data as to the period of pregnancy in which patients come to the clinic and none as to when treatment was begun, and no record of results of treatment in terms of follow up of the children born.

In the matter of following cases with observation and serologic tests for a reasonable period particularly, this study shows urgent need of improvement. For the most part one might assume from the answers to this question that no concern for the child is manifested beyond birth or a few weeks after birth. Of the 268 clinics, only twenty-one hazard any answer to the question at all and many of these obviously are only guesses. Only three clinics indicate results based on a stated plan and period of follow up of infants. The answers of the twenty-one clinics to this question were as follows:

1. Ninety-nine per cent negative reactions.
2. Ninety-nine per cent protected for six months.
3. Negative Wassermann reactions in 95 per cent.
4. All negative babies.
5. In fully treated cases 100 per cent are protected. We follow up every three months. Based on results of a year's survey in 1930, cases being considered "treated" if the mother had had any antisyphilitic treatment at all no matter how inadequate, we have the following results: Good (normal baby at 2 weeks): treated, 88 per cent; untreated, 48 per cent. Bad (premature, stillbirth, neonatal death, stigmas): treated, 12 per cent; untreated, 52 per cent.
6. One hundred per cent in five cases.
7. One hundred per cent in two cases.
8. One hundred per cent in two cases followed six months.
9. Ninety-eight per cent of those who took regular treatment.

10 and 11. One hundred per cent normal children at birth.

12. Twenty-one cases followed with blood tests for eleven months. Twenty-five out of twenty-six negative and completely healthy.
13. All but one in 124 cases.
14. Treatment begun up to three months, 95 per cent protected. Treatment begun from three to six months, 70 per cent protected. Treatment begun from six to nine months, 40 per cent protected.
15. One hundred per cent in those treated early.
16. One hundred per cent in two cases.
17. One hundred per cent in first half of pregnancy.
18. About 100 per cent.
19. In 1934, 87.5 per cent of babies were Wassermann negative.
20. One hundred per cent before five months.
21. Ninety-five per cent of those treated before six months.

On the whole, this study indicates encouraging progress toward the prevention of congenital syphilis through the routine use of the serologic test of pregnant women. It emphasizes the need of more persistent effort to secure early diagnosis and early treatment. It indicates also the urgent need of more adequate record keeping and particularly of longer and more thorough follow up of children born of syphilitic women, and scientific analysis of the results of treatment in the light of extended observation and tests.

TABLE 2.—*Registration Before the Middle of Pregnancy*

Percentage of Patients	Number of Clinics	
Less than 30 per cent	11	
From 30 to 39 per cent	16	
From 40 to 49 per cent	29	
From 50 to 59 per cent	30	
From 60 to 69 per cent	15	62, or 44%
Over 70 per cent	17	
Total	142	

SEROLOGIC TESTS IN PRIVATE OBSTETRIC PRACTICE

A questionnaire was sent to 250 private physicians supposedly engaged in obstetric practice, being either members of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons or of the New England Obstetrical and

Gynecological Society. Eighty-two replies suitable for analysis were received. A considerable number more replied that they are not now engaged in the practice of obstetrics. The questions and a summary of the replies were as follows:

Question 1. Do you now or have you ever for a considerable period made blood tests for syphilis as a routine on all pregnant women in your care as private cases?

Forty-two, or 51 per cent, answered "yes." Forty, or 49 per cent, answered "no."

This is a much more favorable showing than our general impressions had led us to anticipate. It is encouraging not only in that at this time more than half of the physicians reporting are making the use of the blood test a routine practice but also in that the practice in most cases has been adhered to for a considerable period of years, ranging from one to seventeen years, the average being eight and one-half years.

Question 2. If so, what percentage of positive diagnoses has been made?

The thirty-seven replies to this question range from 0.0 to 3.5 per cent (table 3).

Three additional physicians reply respectively "one case," "one in sixteen cases," and "one this year."

It is seen that in one group of seventeen physicians the positive cases range from 0 to 0.6 per cent, and among another

Table 3.—*Positive Diagnoses*

	Per Cent
5 physicians	0.0
2 physicians	0.01
1 physician	0.05
1 physician	0.1
1 physician	0.25
1 physician	0.4
3 physicians	0.5
3 physicians	0.6
13 physicians	1.0
2 physicians	2.0
1 physician	2.4
3 physicians	3.0
1 physician	3.5

group of twenty physicians, more than half of the total, the positive cases range from 1 to 3.5 per cent. Surely this reported range of the prevalence of syphilis in private obstetric practice abundantly justifies and suggests the urgency of the routine use of the serologic test. This receives support from the fact that for the most part the physicians who report the low percentage of positives are just as emphatic as to the importance of the routine test as are those who report the higher percentage. One physician has made the blood test as a routine procedure for twelve years, although in nine years and 197 cases he has had no positives. Another physician has made the blood test as a routine since 1925, although in the 450 cases cared for he has had no positives. One physician has made the blood test as a routine for five years, although in 1,000 cases he has had only one positive. This is in line with a statement by Moore of Johns Hopkins, granting that in private practice one may have to make 200 tests to get one positive, but insisting that if the rate were 1 in 1,000 it would be abundantly worth while. One physician has made the test as a routine for fifteen years, during which in 4,955 cases he has had 0.6 per cent positive.

Question 3. Do you consider it generally feasible to make blood tests as a routine in private obstetric practice. If not, why not?

Fifty-five physicians answered "yes"; twenty-one answered "no"; six made a qualifying comment. It is significant that the great majority of these obstetricians regard the routine blood test in private practice as feasible, including sixteen physicians who are not as yet doing so.

The following are samples of the affirmative replies made:

1. "Yes, not only feasible but imperative."
2. "Absolutely, yes."
3. "Yes, if the health department will make tests without charge and patients are educated as to the value of prenatal care."
4. "Yes, the patients rather welcome the report. Only one has objected in 1,000 cases."
5. "Yes, there is no objection on the part of my patients."
6. "Yes, there is as a rule very little objection."
7. "Yes, and I should say of great value, and there is very little trouble or expense attached to the examination, as the health department does the work."
8. "Yes, absolutely. No explanation is made except that I wish to take some blood for examination."
9. "Yes, not only feasible but patients expect and often demand it."
10. "Yes, no trouble at all. I make several different tests on the blood and do not mention the type of test I am doing."

The following are samples of negative replies made:

1. "No, because of lack of proper education on this point, less than 50 per cent of private patients will submit to a Wassermann test."
2. "No, because of lack of laboratory facilities and extra cost to patients." (Pittsburgh.)
3. "No, because intelligent people of this type do not marry if conscious of an infection." (Comment: Half the people who have syphilis do not know that they have it.)
4. "No, because of type of patients under my care and low incidence of syphilis in the community."
5. "No, because of expense."
6. "No, expense of maintaining laboratory. It requires a full-time technician. Tests done in outside laboratories are too expensive for the average patients and it is too much trouble to transfer specimens to the city laboratory."
7. "No, patients object to added expense."
8. "No, some patients resent being investigated for lues."
9. "No, the patients will object and feel that suspicion is being cast upon their character."
10. "No, at the present time it is not feasible to do this in Boston." (Other Boston physicians do find it feasible in practice.)

It seems obvious that the frequently recurring objections on the ground of added expense have little or no sound basis, as free serologic service by city or state health departments is available in almost all cities and states.

It seems too that hesitancy to make the blood test on the ground that patients will object is based on fearful surmise rather than on actual experience with the practice. In this study not a single instance is stated in which a physician undertook to make blood tests as a routine and was obliged to give it up because the patients objected. As is indicated by some of the doctors, blood examinations are made for a variety of purposes and the exact reason for taking blood is not always, and need not be, made known to the patient.

Question 4. If it is possible to give the number of cases involved in your data, it will be helpful.

Twenty-four of the doctors report the number of patients involved in their report. The numbers range from 50 to 4,955. The average number per physician is 1,271. The numbers are sufficiently large to render the reports distinctly significant.

This study seems to show an encouraging trend with reference to the rôle of the private physician in the prevention of congenital syphilis. It is to be noted, however, that considerable reluctance to employ the routine use of the blood test on pregnant women still exists among private practitioners. In view of the strategic position of the private physician in this aspect of syphilis control, it is to be hoped that the practice and experience of the majority of the physicians here reporting will encourage many more hesitating ones to adopt the rule "a blood test early for every pregnant woman."

50 West Fiftieth Street.

V 106
1936

Book Notices

Manson's Tropical Diseases: A Manual of the Diseases of Warm Climates. Edited by Philip H. Manson-Bahr, D.S.O., M.A., M.D., Physician to the Hospital for Tropical Diseases, London. Tenth edition. Fabrikoid. Price, $11. Pp. 1003, with 462 illustrations. Baltimore: William Wood & Company, 1936.

It is difficult to cover the field of tropical diseases in a book in manual form. Many of these diseases are of world-wide importance and a rather complete discussion of them is necessary. Yet in this edition the author has kept the volume within reasonable bounds and retained its handy and practical character. Many advances have been made in the six years that has elapsed since the previous edition, and perhaps the most important of them have been in the department of virus diseases. The research on yellow fever alone in the last few years has reaped a harvest of knowledge, some of which has led to identification of other diseases. In fact, the designation "tropical diseases" today is scarcely correct, since many of them have recently been found prevalent in temperate climates. The author has concentrated his attention in this edition on the clinical aspects of disease in the tropics and has made a special feature of the detailed instruction in treatment. He has been led, therefore, inevitably to a revision of the classification of tropical diseases on a more natural basis. He has deleted much nonessential scientific matter in zoology, as that information has become readily available in specialized works. This edition is profusely illustrated with colored drawings and other illustrations. It has tables to aid in the differential diagnosis, for example, between bacillary and amebic dysentery, and between sunstroke and heat exhaustion and heat hyperpyrexia. The influence of the discovery of the vitamins on some of the tropical diseases is shown in about fifty pages devoted to the subject. It is a little disconcerting in the chapter on heat stroke and sun stroke to find the ingestion of salt mentioned in the treatment of heat stroke without any mention of the notable confirmation of that fact in the care of the laborers during the construction of Hoover Dam. The newer drugs for the treatment of amebic dysentery are reviewed; the etiology of sprue is said to be still obscure, the Monilia theory having been abandoned. The author claims the credit for discovering that infection with Monilia psilosis, named by Ashford, was in fact only a terminal infection. This edition undoubtedly will maintain the high position which this book has long held as a standard textbook on tropical diseases.

La neurosis obsesiva: El sado-masoquismo en el pensamiento obsesivo y en la evolución sexual. Por el Dr. Jorge Thenon, médico del Hosp. Ramon de Buenos Aires. Paper. Price, $10. Pp. 405. Buenos Aires: "El Ateneo," Libreria cientifica y literaria, 1935.

This is a large work and is psychoanalytic in its tendencies, although there are a number of places, particularly in the general consideration of the subject, where the author shows a familiarity with other types of psychopathologic theory. The book is divided into four parts, the first dealing particularly with the obsessive psychoneuroses. The author classifies them (not according to American conventions) and discusses the mechanisms involved in them with particular reference to other psychoneurotic entities. The second part deals with obsessive thought, and this is a highly psychoanalytic discussion of such features as the verbal formulation of images, numerical tabus, basic development of psychoanalytic thought, ideas of persecution, and many other types of thinking which must be looked into for an understanding of this type of mental disorder. The third part treats of the influence of sadomasochistic complexes on the obsessive psychoneurosis. In some of Freud's recent works, comments are made about this relationship; but they had not been fully discussed until Thenon took the matter up in the present book. The last part treats of the genesis of the sadomasochistic reactions and this part, like the others, covers a vast amount of ground. While this book is highly theoretical and contains almost no case history material, it stands out as a substantial contribution to psychoanalytic theory. Although its point of view is slightly different from that held by most Anglo-American psychoanalytic investigators, its formulations are helpful in developing new concepts of the sadomasochistic and obsessive neurotic mechanism, discussing material that has needed amplification. It probably is too technical for the casual medical reader. It contains a number of statements that will be criticized by the organically minded psychiatrist and there are even some ideas that will be disagreed with and criticized by conventional freudians. It does present a point of view that cannot lightly be passed over by those interested in the psychopathology of the psychoneuroses.

A Textbook of Bacteriology. By Thurman B. Rice, A.M., M.D., Professor of Bacteriology and Public Health at the Indiana University School of Medicine. Cloth. Price, $5. Pp. 551, with 121 illustrations. Philadelphia & London: W. B. Saunders Company, 1935.

The author has endeavored to provide a shorter textbook of bacteriology that includes the real fundamentals necessary for the study of bacteriology. In his book he has shortened the description of cultural characteristics as well as the detailed instructions for laboratory technic and has largely omitted theoretical discussions of controversial subjects in favor of the more practical phases of the subject. The physician as well as the student will find, however, practically everything that may be needed for the treatment and control of diseases due to bacteria. The technical processes described here are those which may be done by the busy practicing physician who has limited time and equipment. The subject matter is unusually well presented in a clear and pointed style, and the numerous drawings are equally clear and instructive. As previously indicated, this book is smaller than the usual textbook of bacteriology, and it should prove attractive to medical practitioners and also to medical students.

Sanity First: The Art of Sensible Living. By Joseph Jastrow. Cloth. Price, $2.50. Pp. 312. New York: Greenberg, 1935.

The author of this volume is well known for previous "inspirational" texts. He is a conservative, elderly psychologist who has taught this subject to college students for many years. He can be said to have his feet well on the ground but not to be unduly impressed by such new and apparently significant technics as psychoanalysis and individual psychology, although he does discuss them. The present volume consists of five chapters, on (1) accepting our endowments, (2) employing our resources, (3) regulating our beliefs, (4) handling our liabilities and (5) patterning our expressions. Under each of these are a half dozen or more brief discussions of various psychologic topics described in such a fashion that it seems to be the answer to an implied question. In the course of the volume it seems that everything of popular interest in psychology is superficially covered: types of personalities, emotions, psychologic quackery of various sorts, the lie detector, primitive tendencies and other topics of interest to the general reader. The volume is light, is interesting, and takes almost no time to read. The implied purpose that it is to serve, of aiding a person to maintain his sanity, would probably be nil. As a scientific text for a physician it would seem to have little value, for the same material is presented more thoroughly and practically elsewhere. Nevertheless, it might be predicted that the book will have a good sale, for there are thousands of psychoneurotic and other maladjusted persons who feel that they will be able to adjust their personality by the reading of inspirational books. It is certain that the information conveyed in this book is sufficiently accurate and handled so well that it will do no harm and the occasional neurotic who can benefit by such a book may do as well with this volume as with any of the others of similar ilk.

An Introduction to Public Health. By Harry S. Mustard, M.D., Associate Professor, Public Health Administration, The Johns Hopkins University. Cloth. Price, $2.50. Pp. 250. New York: Macmillan Company, 1935.

The author here presents a brief and for the most part a dispassionate survey of the situation as it exists in the field of public health. He presents the conflicting views of individualism on the one hand and the doctrine that government ought to be doing more and more for the health of the individual, with what appears to be a real attempt at fairness. Yet one reads between the lines throughout, and sometimes in the lines, his conviction that government not only must go further in providing for the protection of the public health than it has yet gone but in order to do so must provide medical care for certain

elements of the population through public health agencies. He discusses the question of medical care as a function of the public health, when as a matter of fact any broad conception of medicine must contemplate public health as a function of medical care. His chapter on medical care is based almost wholly on the studies made by the Committee on the Costs of Medical Care. Either he chooses to ignore the studies in this field made by the Bureau of Medical Economics of the American Medical Association, which argues bias, or he has not heard of them, which argues inadequate familiarity with his field. His bibliography on medical care does not mention studies made by the American Medical Association. He refers to state medicine as the "whipping boy" of the official medical leaders in the United States and apparently chooses to ignore the fact that medical leaders are guided by the official policies enacted by the House of Delegates of the American Medical Association, a democratic representative body. At a time when public health leaders and medical leaders alike are looking toward harmonious cooperation between the practicing physician and the public health official, this chapter, conspicuously placed in the book as chapter I, is particularly unfortunate, not to say destructive. It spoils what would otherwise be a serviceable, though by no means an outstanding, manual on public health in the United States.

Appareil circulatoire. Par Ch. Laubry, médecin de l'Hôpital Broussais. Collection des initiations médicales, publiée sous la direction du Dr A. Sézary. Paper. Price, 22 francs. Pp. 186, with 32 illustrations. Paris: Masson & Cie, 1935.

This small textbook on the circulatory system is one volume of a series of medical subjects written for French medical students. The author is one of the leading cardiologists of France and a prolific contributor to current cardiac literature. The book is divided into three parts, with eleven chapters and a brief index. The first part covers subjective and objective cardiovascular diagnosis. The second portion is a description of the various types of heart disease. The third portion is concerned with the subject of ventricular failure. The chapters on cardiac x-ray and electrocardiography are well written and clearly illustrated with diagrams and photographs. The author's discussion of syphilitic myocarditis is typical of the French school and contrary to the American view that it is of infrequent occurrence. His views on hypertension, rheumatic valvular disease and coronary disease are the same as those current on this continent. One exception is the statement that coronary thrombosis is often of syphilitic etiology. In the chapter on cardiac failure, he ranks digitalis as the drug of first choice and mentions theobromine, ouabain and strophanthus. Mercurial diuretics do not appear to have found his favor. The book is of value to the American reader for a brief and concise analysis of the current French view of cardiovascular disease.

Electrotherapy and Light Therapy. By Richard Kovács, M.D., Clinical Professor and Director of Physical Therapy, Polyclinic Medical School and Hospital, New York. Second edition. Cloth. Price, $7.50. Pp. 696, with 264 illustrations. Philadelphia: Lea & Febiger, 1935.

New information has been added to the original volume, and many revisions have been made. The book is divided into four sections. Part I deals with the fundamentals of electricity, and the chapters are written in a style that should appeal to the busy physician who has not had opportunity to keep abreast of the advances in applied physics. Part II is on general electrotherapy and electrodiagnosis. These chapters contain information on galvanic and faradic currents, on their indications in therapeutics, and on what might be expected in short wave diathermy. Writing on the last named field, the author is conservative in his statements. Part III concerns light therapy, with chapters devoted to infra-red, luminous and ultraviolet radiant energy. Part IV deals with applied electrotherapy and light therapy. There are chapters devoted to surgical diathermy, gynecology, and genito-urinary and proctologic conditions. The author calls attention to contraindications, as well as indications, of the various therapeutic methods that are taken up. A chapter on dermatologic conditions has been prepared by Dr. Joseph Jordan Eller, and a chapter on diseases of the ear, nose and throat by Dr. Wallace Morrison. One section has to do with static machines and methods. Little evidence of a critical nature has been put forth to substantiate this method of treatment. Although the book discusses, for the most part, the therapeutic uses of apparatus, the author is judicious in mentioning that it is by no means necessary to possess a large array of machinery to produce a few basic physiologic effects. He has evidently paid close attention to the reports of the Council on Physical Therapy, since here and there he makes mention of Council material. The book may be recommended as one of the leading contributions to physical therapy, and those physicians who wish to obtain information in a concise form should find the volume valuable in their practice.

Sammlung psychiatrischer und neurologischer Einzeldarstellungen. Herausgegeben von Prof. Dr. A. Bostroem und Prof. Dr. J. Lange. Band VII: Zur Genealogie psychopathischer Schwindler und Lügner. Von Dr. med. Walter von Baeyer. Paper. Price, 16 marks. Pp. 234. Leipzig: Georg Thieme, 1935.

This volume of Bostroem and Lange's collection of research in neurologic and psychiatric subjects is a return to the older type of German research. For some reason a number of recent neuropsychiatric monographs from that country have not been as thoroughgoing as they used to be, but von Baeyer's study is a competent and capable review of a large number of criminal cases which he has studied. His material is obtained from the neuropsychiatric clinic at the University of Heidelberg and also the nervous and mental clinic at Munich. The material itself was not obtained by direct examination but rather by an analysis of case histories. There are studies of 125 cases. The author divides the various types of pathologic liars, thieves, swindlers and embezzlers into two groups, the first the pseudological cheat and the second the other types of abnormal swindlers. In the first group forty-two cases are studied and in the second group twenty-five. A third section of the monograph is devoted to those cases of both groups which presented abnormal mood changes. The author analyzes and tabulates practically all possible social and psychiatric features in both the patients themselves and in their relatives. There are ten small tables showing various types of occupations of parents and various personality features in the siblings as well as their callings and there is much cross tabulation to show the significance of psychosis and major mental changes in the parents. Twenty-six pages are devoted to a table showing the sociological data of the first group and 123 pages are utilized in giving anamneses and other observations in the case histories of selected cases. Also in this part are given the case histories of the relatives of patients studied. The author concludes that knowledge of the complete family history of the parents is insufficient to enable one to prognosticate whether a person is going to be a pathologic liar or swindler. He implies but does not completely demonstrate that there is more relationship between the patient and his siblings. All together, the work is well done. While a great deal more basic facts are given than seems necessary, the study is thorough and interesting.

The International Medical Annual: A Year Book of Treatment and Practitioner's Index. Edited by H. Letheby Tidy, M.A., M.D., F.R.C.P., and A. Rendle Short, M.D., B.S., B.Sc. Fifty-Third Year, 1935. Cloth. Price, $5. Pp. 522, with 124 illustrations. Baltimore: William Wood & Company, 1935.

This tells, year by year, the advances in medical science. The interest of the book depends on the medical work that is available for recording. An effort is made to include treatment that can be employed by the physician in general medical practice. The newer work in clinical pathology is summarized. The book is made up of a series of short articles by various medical contributors. The subjects are listed alphabetically. In addition, a complete index is appended, which makes the finding of the material simple. There is material concerning industrial medicine, sycosis and infectious diseases. A full review on the subject of electrical injuries, migraine, carcinoma of the lung, serum treatment of pneumonia, thyroidectomy, heart disease, reducing and barbiturate poisoning are included. Material on surgery concerns the discussion of the diseases of the ear, nose, throat and eye, the surgery of childhood, and general surgery in radiology and anesthetics. The busy practitioner finds in a book of this type a way of keeping himself informed in medical progress.

V 106
1936

La castration chez l'homme et les modifications morphologiques qu'elle entraine: Recherches sur les adeptes d'une secte d'eunuques mystiques, les Skoptzy. Par Eugène Pittard, professeur d'anthropologie à l'Université de Genève. Paper. Price, 60 francs. Pp. 329, with 70 illustrations. Paris: Masson & Cie, 1934.

This volume is based on an extensive study of a large group of castrated males, belonging to a strange cult found chiefly in Rumania and known as the Skoptzy. The first portion of the book offers an interesting discussion of the historical and social aspects of castration. The remainder of the volume is devoted chiefly to comparative descriptions and measurements of the castrates. This work appears to be authoritative and complete from an anthropologic standpoint. It offers little or nothing that is new to the endocrinologist.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Liability of Physician for Malpractice by his Physician-Employee.—Dr. Huckleberry, intending to be absent on his vacation, arranged for Dr. Shininger to spend a part of each day in Dr. Huckleberry's offices and to take care of the work there. For this service he agreed to pay Dr. Shininger a stated sum per day. On Aug. 25, 1933, the plaintiff fell in her home, and some glassware that she was carrying broke and cut a deep gash straight across her left leg below the knee cap. Dr. Huckleberry was the plaintiff's family physician, so she was taken immediately to his office. There she found Dr. Huckleberry absent and Dr. Shininger in charge, and she was treated by Dr. Shininger. Using Dr. Huckleberry's equipment and assisted by his nurse, Dr. Shininger washed the wound, probed for glass, and sewed up the surface wound without repairing or attempting to repair the possibly severed tendon below it. He made no x-ray examination and later it was alleged that he neglected to make tests to determine whether the patellar tendon, lying directly beneath the wound, had been severed. About ten days later, when he removed the sutures, the plaintiff called his attention to the fact that she had no use of the injured leg and he told her that "it was all in her head"; that she could and should use it and it would be all right.

Prior to the accident described, the plaintiff had on two occasions suffered "some cartilage trouble in her left knee," the most recent occasion having been some six or seven years before the accident. On these occasions the knee gave way under her, swelled up, and disabled her for about two or three weeks. About six weeks after her accident of August 25, the plaintiff suffered a recurrence of her old knee trouble. She consulted a physician who, as soon as the swelling had sufficiently subsided, made an x-ray examination and discovered what appeared to be bony fragments below the knee cap. He thereupon referred her to an orthopedic surgeon. The orthopedic surgeon found that the patellar tendon had been severed, and on Feb. 7, 1934, he operated. He repaired the damage, and at the time of the trial the plaintiff showed considerable improvement, although she was still on crutches. Dr. Shininger made no charge for his services to patients treated in Dr. Huckleberry's offices or to any of Dr. Huckleberry's patients. For all such services Dr. Huckleberry rendered bills to the patients treated, including the plaintiff, and applied whatever money he collected to his own use and benefit. The plaintiff sued both Dr. Huckleberry and Dr. Shininger for malpractice. The cause was tried without a jury, findings of fact were made, and judgment was rendered in favor of the plaintiff. The defendants thereupon appealed to the Supreme Court of Oregon.

All physicians who testified, including the defendants themselves, stated that if the patellar tendon was severed the most simple test would disclose it and that that test should be made regardless of what physician treated the case. They, including the defendants, admitted, too, that the exercise of the slightest diligence on the part of a physician would disclose the nature and extent of such an injury and that a physician who failed to apply recognized tests would be guilty of negligence. Dr. Shininger testified that he tested the condition of the plaintiff's knee joint by asking her to extend her knee, that her cooperation was poor, but that after a while she did extend the joint, although not fully. Nevertheless, said the Supreme Court, the testimony tended to show, and the trial court found, that he did not use proper care and skill in the diagnosis of the plaintiff's condition and failed to use proper and well known tests to ascertain, by requiring the plaintiff to extend her leg horizontally, whether the tendon was or was not severed from the knee cap. The Supreme Court could discover nothing to justify it in changing the finding of the trial court.

The defendants contended that even if there was malpractice on the part of the defendant Shininger, the defendant Huckleberry was not liable for it; that there was no agency between them, and that Dr. Shininger, in treating the plaintiff, was an independent contractor. Defendant Shininger, in his treatment of the plaintiff, it was pointed out, was not directed by the defendant Huckleberry. But, said the Supreme Court, defendant Huckleberry at all times had the right to control the actions of the defendant Shininger or to terminate his employment. The Supreme Court quoted with approval from the opinion of the trial court:

> The argument that the employed physician must be held to be an independent contractor because his employer could not direct the means and methods by which the former should perform an operation, seems to me to prove too much. The same argument might be used with reference to the employer of a truck driver who sends him out to deliver a load of goods. The employer is in no position to direct the driving of the truck when an accident impends, but the relation of master and servant, and principal and agent, is not for that reason impaired.

A physician who recommends or sends another physician to his patient, said the Supreme Court, is not liable for injuries resulting from the want of skill or care on the part of the substitute physician, unless the substitute physician is in the employment of the physician who recommends or sends him or is definitely his agent or partner, or unless the principal physician does not exercise due care in making the recommendation or substitution. But when one physician is employed by and is definitely the agent of another physician, the employing physician is liable for the negligent treatment or malpractice of his employee. In the present case, too, the defendant Huckleberry may be said to have ratified the treatment given by the defendant Shininger by presenting for collection a bill claiming payment for the defendant Shininger's services. The liability of the defendant Huckleberry was summed up by the Supreme Court as follows:

> Taking into consideration all of the circumstances to which we have referred tending to show the relation of master and servant, that is, the mode of payment, use of the master's premises, materials, equipment, appliances, and nurse, the contract made between the parties, the master's right to terminate the employment at any time, Dr. Huckleberry's right to direct how the work should be performed, if he had been present or had the opportunity, the fact that the servant or employee was not employed to do a specific piece of work but was employed generally to do all the work of the master, and the other circumstances existing, they constitute sufficient evidence that Dr. Shininger was the employee of Dr. Huckleberry, and that Dr. Huckleberry was responsible for the conduct and improper treatment of plaintiff.

The Supreme Court expressed sympathy with Dr. Huckleberry in his position as the defendant in a malpractice suit when he took no part in the treatment of the plaintiff except by contract, but it nevertheless had to affirm the judgment of the trial court against both the defendants.—*Moulton v. Huckleberry (Ore.), 46 P. (2d) 589.*

Workmen's Compensation Acts: Mesenteric Hernia Attributed to a Fall.—On April 13 the claimant, during the course of his employment, stumbled and fell. He experienced a sharp pain in the region of his stomach and was nauseated. After a short rest the pain decreased in severity and he resumed his work but did not feel as well as usual. Two days later, while hanging a bunch of bananas, he again became nauseated. The abdominal pain recurred and progressed in severity until an operation was necessitated, April 17, which disclosed a mesenteric hernia. A considerable portion of the intestine was distended and discolored, two feet of which had passed through a perforation or aperture in the mesentery. The intestine was removed from the aperture and the claimant made a normal

recovery. The industrial accident board denied a claim for compensation, on the ground that the hernia had existed to some degree prior to April 13 and did not result from an accidental injury. The district court reversed the board's order and directed an award in the claimant's favor. Thereupon the employer's surety appealed to the Supreme Court of Idaho, contending that a perforation or defect in the mesentery existed prior to April 13, that the defect in itself constituted a hernia, and that, unless it was proved that the defect resulted from the accident, the claimant suffered no compensable injury even though the evidence conclusively showed that the protrusion of the intestine through the aperture resulted directly from the accident.

The testimony of the medical witnesses for the claimant and the surety was singularly in accord, the court said. The witness for the surety testified that the perforation in the mesentery was congenital or at least had existed for a long period of time prior to the accident. Witnesses for the claimant, while testifying that the perforation occurred at the time of the accident, also testified that the perforation may have existed for some time and that there was nothing to indicate how long it had existed. All witnesses agreed that the protrusion of the intestine through the perforation or defect in the mesentery was caused by the fall on April 13 and was further accelerated at the time the claimant lifted the bunch of bananas, April 15. From this testimony, the court said, the correctness of the trial court's conclusion depended on the meaning of the word "hernia." After reviewing the authorities, the court declared a hernia to be a protrusion of some organ or tissue from its normal situation through an accidental or natural opening in the wall of the cavity in which it is contained, and that the mere presence of a perforation or an aperture in the cavity wall, either accidental or natural, and through which some organ or tissue may protrude at a later time, is not a hernia within the meaning of the workmen's compensation act of Idaho. The judgment of the trial court was therefore affirmed, and the cause remanded to that court with instructions to return the case to the industrial accident board, directing it to enter an award in favor of the claimant.—*Stoddard v. Mason's Blue Link Stores (Idaho), 45 P. (2d) 597.*

Malpractice: Sponge Left in Abdomen—Res Ipsa Loquitur.—A cesarean section was performed on Mrs. Wallace at the defendant hospital by the physician-defendant, assisted by several nurse employees of the hospital. The patient lost a large amount of blood and it was necessary to operate very rapidly and to use a large number of laparotomy or surgical sponges. To each sponge was attached a tape of flat cloth about 12 inches long so that a ring or other object could be attached and left outside the surgical cavity to prevent the sponge from being lost. Apparently neither the physician nor the nurses made any sponge count before the surgical cavity was closed. Infection seemed to follow the operation and about five weeks later when another physician operated he found in the abdominal cavity a sponge with nothing attached to its tape. The plaintiff and her husband brought suit against the physician and the hospital. The trial court directed a verdict in favor of both defendants but later granted the plaintiffs a new trial. The physician and the hospital appealed to the district court of appeal, third district, California, which affirmed the order for a new trial as to the physician but reversed it as to the hospital. 37 P. (2d) 467; THE JOURNAL, Sept. 28, 1935, p. 1068. The instant decision was apparently rendered by the district court on a rehearing.

The district court determined that the defendant hospital was a charitable institution, that it had used due care in the selection of its nurses and hence was exempt from liability. It accordingly in part reversed the order of the trial court and gave judgment in favor of the hospital.

Apparently the trial court ordered a new trial as to the physician because it believed that it had erred in refusing an instruction, which, in effect, would have made the doctrine of res ipsa loquitur applicable to the facts. The physician, relying on the rule that where the plaintiff makes specific allegations of negligence he must rely on such specific allegations of negligence and cannot recover for any other negligent act, contended that the doctrine did not apply here because the plaintiffs had alleged specific acts of negligence. But, said the district court of appeal, the plaintiffs alleged negligence on the part of the physician in that he, during the operation, negligently and carelessly deposited and left a sponge within the patient's abdomen and that he negligently and carelessly closed the incision without first removing the sponge. These allegations do not allege specific acts of negligence but at most merely charge that the physician negligently left a sponge in the abdomen of the plaintiff. No attempt was made to describe the negligence in detail or charge why or under what circumstances it occurred. The form of the allegations is not such as to prevent the application of the doctrine of res ipsa loquitur. The physician next contended that the doctrine was not applicable because it does not apply when two defendants are involved as here. In answer the district court of appeal cited *Godfry v. Brown*, 220 Calif., 57, 29 P. (2d) 165, holding contrary to the physician's contention. Here, said the court, the patient was, during the operation, under an anesthetic; the physician was in charge; the sponge was not discovered until some five weeks thereafter; as to why it was left there or how it happened to be left, the patient has no information or means of information; such facts were peculiarly within the knowledge of the physician. The court did not deem it necessary to determine whether or not the physician was responsible for the acts of the nurses because, in the opinion of the court, it appears that a definite responsibility rests on an operating physician to know whether or not the sponges used in an operation are all accounted for. It is conceded that the physician did not count the sponges himself or require the nurses to do so. This seemed to the court to be an admission that he did not affirmatively satisfy himself as to whether or not all sponges were accounted for. He had the power and the duty to direct the nurses to count the sponges as part of his work in the opening and closing of the patient's abdomen, and the putting in and taking out of sponges. He cannot relieve himself of liability by any custom requiring the nurses to count the sponges used and removed. For these reasons the court concluded that it was erroneous for the trial court originally to refuse the instruction as to the applicability of the doctrine of res ipsa loquitur.

The physician further urged that what constitutes proper medical practice can be established only by expert testimony. With this general rule, the court answered, we have no complaint, but it does not require the testimony of expert witnesses to enable a court or jury to conclude that leaving a sponge 14 inches square in an abdominal cavity, on the completion of an operation, and permitting it to remain undiscovered for five weeks, does not constitute good medical practice.

The court affirmed the order of the trial court granting a new trial as to the physician-defendant but ordered that a judgment be entered in favor of the defendant hospital.—*Armstrong v. Wallace (Calif.), 47 P. (2d) 740.*

V 106
1936

Society Proceedings

COMING MEETINGS

American College of Physicians, Detroit, Mar. 2-6. Mr. E. R. Loveland, 133 South 36th Street, Philadelphia, Executive Secretary.
American College of Radiology, Chicago, Feb. 16. Dr. Benjamin H. Orndoff, 2561 North Clark Street, Chicago, Executive Secretary.
American Orthopsychiatric Association, Cleveland, Feb. 20-22. Dr. George S. Stevenson, 50 West 50th Street, New York, Secretary.
American Physiological Society, Washington, D. C., Mar. 25-28. Dr. A. C. Ivy, 303 East Chicago Avenue, Chicago, Secretary.
American Society for Experimental Pathology, Washington, D. C., Mar. 25-28. Dr. Shields Warren, 195 Pilgrim Road, Boston, Secretary.
American Society for Pharmacology and Experimental Therapeutics, Washington, D. C., Mar. 25-28. Dr. E. M. K. Geiling, 710 North Washington Street, Baltimore, Secretary.
American Society of Biological Chemistry, Washington, D. C., Mar. 25-28. Dr. H. A. Matill, Chemistry Bldg., State University of Iowa, Iowa City, Secretary.
Annual Congress on Medical Education, Medical Licensure and Hospitals, Chicago, Feb. 17-18. Dr. W. D. Cutter, 535 North Dearborn Street, Chicago, Secretary.
Federation of American Societies for Experimental Biology, Washington, D. C., Mar. 25-28. Dr. E. M. K. Geiling, 710 North Washington Street, Baltimore, Secretary.
Mid-South Post-Graduate Assembly, Memphis, Tenn., Feb. 11-14. Dr. A. F. Cooper, Goodwyn Institute Building, Memphis, Tenn., Secretary.
Pacific Coast Surgical Association, Del Monte, Calif., Feb. 20-22. Dr. Edgar L. Gilcreest, 384 Post Street, San Francisco, Secretary.
Southeastern Surgical Congress, New Orleans, March 9-11. Dr. Benjamin T. Beasley, 478 Peachtree Street N.E., Atlanta, Ga., Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Periodicals are available from 1925 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Alabama Medical Association Journal, Montgomery

5: 205-240 (Dec.) 1935

Concept of Psychiatry. F. A. Kay, Tuscaloosa.—p. 205.

Pneumonia and Empyema in Children. W. W. Anderson, Atlanta, Ga. —p. 207.

Mild Hypothyroidism: Report of Cases. R. O. Russell, Birmingham. —p. 209.

Clinical Importance of Low Blood Calcium: Report of Cases. J. W. Boggess Jr., Guntersville.—p. 212.

American Journal of Diseases of Children, Chicago

50: 1351-1642 (Dec.) 1935

*Syndrome of Diffuse Muscular Hypertrophy in Infants Causing Athletic Appearance: Its Connection with Congenital Myxedema. R. Debré and G. Semelaigne, Paris, France.—p. 1351.

Poliomyelitis: II. The Bulbar Type. J. A. Toomey, Cleveland.—p. 1362.

Asthma in Children: XII. Influence of Specific and Nonspecific Treatment on Differential Leukocyte Count, with Especial Reference to Eosinophils. M. M. Peshkin, New York, and W. Messer, Brooklyn. —p. 1374.

Gastric Aspiration in Children with Pneumonia to Obtain Material for Pneumococcus Typing. S. A. Wittes and J. G. M. Bullowa, New York.—p. 1404.

Plotting of Graphic Record of Growth for Children Aged from One to Nineteen Years. Leona M. Bayer and H. Gray, San Francisco. —p. 1408.

*Pathology of Steatorrhea. A. H. Parmelee, Chicago.—p. 1418.

Maldevelopment and Maldescent of Testes: II. Further Observations on Treatment with Anterior Pituitary-like Gonadotropic Hormone. G. B. Dorff, Brooklyn.—p. 1429.

*Roentgen-Positive Seronegative Infantile Congenital Syphilis. N. R. Ingraham Jr., Philadelphia.—p. 1444.

Diffuse Muscular Hypertrophy in Infants.—Debré and Semelaigne report two cases of intellectual backwardness, arrested growth, retarded development and general muscular hypertrophy (athletic aspect) in babies, accompanied by muscular hypertonia in one. The condition of the second baby was transformed by thyroid treatment. They claim that congenital athyroidism may cause this clinical syndrome and offer the idea that the histories of the cases observed by de Lange and described under the title "Congenital Hypertrophy of the Muscles, Extrapyramidal Motor Disorders and Mental Deficiency" pertain to the same category of syndromes. They advise systematic thyroid treatment in such cases.

Pathology of Steatorrhea.—Parmelee asserts that the term congenital steatorrhea has been used to describe a fairly definite clinical condition which differs from the usual picture of celiac disease in the following respects: 1. The onset is in the first weeks of life regardless of the type of feeding. 2. The stools contain an excessive amount of neutral fat as compared to the amounts of fatty acid and of soaps. 3. Free fat in the form of an oily substance often is passed with the feces in large amounts when such a food as butter, cream or cod liver oil is fed. 4. The patient never overcomes this digestive abnormality. In the patients (two of his own and four reported in the literature) who have presented this clinical picture during life, necropsy has revealed a constant pathologic process; i. e., marked fibrosis and great diminution in the amount of secretory gland tissue in the pancreas and bronchopneumonia in the lungs, usually of a subacute type with purulent bronchitis and bronchiolitis and sometimes with numerous widely disseminated miliary abscesses and changes in the alveolar walls indicative of chronic irritation. A possibility is that the lung tissue may be directly damaged by irritating substances, the products of abnormal digestion, carried to it in the venous blood.

Roentgen-Positive Seronegative Congenital Syphilis.—According to Ingraham, from Jan. 1 to Dec. 31, 1934, at the Philadelphia General Hospital, not one of 1,517 babies discharged alive from the maternity ward showed any clinical evidence of congenital syphilis. The Wassermann reaction was of value in diagnosing syphilis in only nine syphilitic children among 195 offspring of syphilitic mothers. The roentgenogram disclosed forty additional cases, twenty-six (19.4 per cent) before the age of 6 days and twenty-three cases (17.1 per cent) at ages from 1 to 10 months. In all these cases the initial skeletal changes were evident roentgenographically before the blood serum gave a positive reaction. Treatment of the mother prior to delivery affects the early roentgenographic evidence as follows: Of fifty-one cases in which the mothers were treated more than two months, in five (9.8 per cent) syphilis was shown in the infants roentgenographically at 6 days; of sixty-eight cases in which the mothers were treated less than two months, in twenty-one (30.8 per cent) there was positive roentgenographic evidence of syphilis in the offspring. Cases in which the roentgenograms revealed no positive signs at the age of 6 days were studied at ages from 3 to 6 months. Of thirty-six cases adequately followed, in twelve (33⅓ per cent) the roentgen evidence subsequently became positive. In three cases serial roentgenograms of the same children taken over a period of several months left no reasonable doubt that the earlier bone changes seen a few days after birth are the precursors of the more advanced and easily recognized bone lesions that developed subsequently. The Wassermann reaction, which originally was negative, became positive as the disease progressed, making a syphilitic etiology seem certain.

American Journal of Public Health, New York

25: 1285-1396 (Dec.) 1935

Public Health: A Problem in Distribution. W. H. Brown, Palo Alto, Calif.—p. 1285.

Fifteen Years of the Committee on Administrative Practice: I. The Initial Steps. L. I. Dublin, New York.—p. 1296.

Id.: II. Evolution of the Program. C.-E. A. Winslow, New Haven, Conn.—p. 1303.

Id.: III. The Point of View of a Health Officer. J. L. Rice, New York. —p. 1317.

Development of Vital Statistics in the Bureau of the Census. H. L. Dunn, Washington, D. C.—p. 1321.

National Aspects of Social Security Program as They Pertain to the Children's Bureau. Katharine F. Lenroot, Washington, D. C. —p. 1327.

Present Status of the Vitamin B Complex. C. A. Elvehjem, Madison, Wis.—p. 1334.

*Vitamin Content of Important Foods in the Child's Diet. C. R. Fellers, Amherst, Mass.—p. 1340.

Some New Emphases in Public Health Nursing. Alma C. Haupt, New York.—p. 1346.

Immunologic Application of Placental Extracts. E. S. Robinson and C. F. McKhann, Boston.—p. 1353.

Recent Experiences in Scarlet Fever Control. J. P. Koehler, Milwaukee. —p. 1359.

Vitamin Content of Foods in Child's Diet.—Fellers furnishes experimental proof that the modern choice of foods for infants and children, from a vitamin point of view, is well founded. Fresh, pasteurized and canned evaporated milks contain from 20 to more than 27 U. S. P. units of vitamin D per quart. Pasteurization and homogenization have no effect on the vitamin D potency of milk. Of the 245 samples of irradiated milk assayed, only five were below the 135 unit level. One of the eight samples of metabolized (yeast) milk and one of the four samples of fortified (Vitex) milk contained less than 400 U. S. P. units of vitamin D per quart. Canned evaporated irradiated milk contained at least 270 units per quart. Forty-three samples of fresh or manufactured fruit products were examined for their vitamin C content. In general, fresh and canned citrus fruits, tomatoes and certain apple varieties (Baldwin, Northern Spy, Ben Davis and Winesap), as well as their juices, are excellent antiscorbutics. Grapes, grape juice, peaches, cherries, prunes, pears and certain varieties of apples (Tolman, McIntosh, Delicious and Jonathan) are poor sources of vitamin C. Fresh and canned pineapple as well as pineapple juice are of moderate antiscorbutic value. While raw, nonacid vegetables are usually good antiscorbutics, cooking and canning are very destructive to vitamin C. During a short cooking period, peas, asparagus, lima beans and spinach lose from 40 to 80 per cent of their vitamin C. The loss in canning may vary from 60 to 90 per cent. Cooked

frozen vegetables are slightly lower in vitamin C than fresh cooked but are considerably higher than the canned vegetable that has been heated for the table. Canned, sieved (puréed) vegetable baby foods have the same or lower vitamin C values than the unstrained canned vegetable. In spite of the destructive action of heat on vitamin C in vegetables, sufficient amounts are retained to be of distinct antiscorbutic value.

Anatomical Record, Philadelphia

63: 325-430 (Nov. 25) 1935

Growth Pattern and Daily Rhythm of Incisor of Rat. I. Schour and S. R. Steadman, Chicago.—p. 325.
Birth Weight in the Gray Norway Rat and Factors That Influence It. Helen Dean King, Philadelphia.—p. 335.
Menisci of Knee Joint in American Whites and Negroes. C. M. Charles, St. Louis.—p. 355.
Method for Preparation of Dried Human Lungs for Teaching and Museum Purposes. G. N. Ronstrom, New Orleans.—p. 365.
Morphology and Development of Metanephric Glomerulus in Pigeon. R. W. Vilter, Boston.—p. 371.
Effects of Estrin on Urogenital Tract of Male Monkey. G. Van Wagenen, New Haven, Conn.—p. 387.
Three Diverse Patterns of Arteria Brachialis Superficialis in Man. A. G. Schwyzer and C. F. De Garis, Baltimore.—p. 405.
*Caudal Level of Termination of Spinal Cord in American Whites and American Negroes. J. H. Needles, St. Louis.—p. 417.

Caudal Level of Termination of Spinal Cord.—Needles observed the level of termination of the spinal cord in 240 adult cadavers; of these 107 were white Americans (ninety-one men and sixteen women) and 133 were American Negroes (105 men and twenty-eight women). The termination was determined by inspection of the lower portion of the spinal cord and was verified by microscopic study in six cases chosen at random. The spinal cords terminated below the middle of the intervertebral disk between the first and second lumbar vertebrae in 55 per cent; 45 per cent of the spinal cords ended above this level. Forty-nine per cent of the spinal cords terminated between the levels of the lower third of the first lumbar vertebra and the upper third of the second lumbar vertebra. The highest level of termination was the middle third of the twelfth thoracic vertebra. The lowest level of termination was the lower third of the third lumbar vertebra. Negro spinal cords terminated at a lower level in the vertebral canal than those of white persons. Female spinal cords terminated at a lower level than those of males.

Archives of Ophthalmology, Chicago

14: 879-1066 (Dec.) 1935

Some Ophthalmic Observations Based on Experience During the Past Fifty Years, with Preface of Brief Historical References. G. E. de Schweinitz, Philadelphia.—p. 879.
Beginnings of Section of Ophthalmology of the New York Academy of Medicine: Address at the Fiftieth Anniversary Exercises, May 20, 1935. P. Fridenberg, New York.—p. 890.
The New York Eye and Ear Infirmary: Historical Sketch. B. Samuels, New York.—p. 896.
The Brooklyn Eye and Ear Hospital, 1868-1935. P. C. Jameson, Brooklyn.—p. 903.
History of Herman Knapp Memorial Eye Hospital. A. Knapp, New York.—p. 909.
History of Manhattan Eye, Ear and Throat Hospital. H. W. Wootton, New York.—p. 914.
Histopathologic Characteristics of Nutritional Cataract in White Rat. W. M. Dodge Jr., Battle Creek, Mich.—p. 922.
Use of Extract of Adrenal Cortex in Glaucoma. A. C. Woods, Baltimore.—p. 936.
Relation of Strabismus to Right or Left Sidedness. W. H. Fink and B. Bryngelson, Minneapolis.—p. 947.
Paracentral Homonymous Hemianopic Scotoma. O. Barkan and S. F. Boyle, San Francisco.—p. 957.
*Cataracts Produced in Albino Rats on Ration Containing High Proportion of Lactose or Galactose. A. M. Yudkin and Caroline H. Arnold, New Haven, Conn.—p. 960.
Treatment of Sarcoma of Uveal Tract. W. G. M. Byers and J. A. MacMillan, Montreal.—p. 967.
Technic of Orthoptic Training in Squint. L. C. Peter, Philadelphia. —p. 975.

Cataracts Produced in Albino Rats.—The ready production of lenticular opacities in the white rat by the inclusion in the diet of a particular type of carbohydrate and the uniformity of the results obtained suggested to Yudkin and Arnold a more complete study of the tolerance of ocular tissue to rations containing various amounts of corn starch, dextrose, lactose and galactose. In the first group of rats the carbohydrate portion of the diet was 70 per cent dextrose, and in the second group 70 per cent of corn starch. The animals remained on this diet for 140 days. No ocular disturbance was noted at any time during the experiment in either group. Fifteen young (21 days) albino rats were fed the basal diet containing 70 per cent lactose. Diarrhea developed at intervals, during which the eyes frequently showed a "milklike" fogginess in the lens, but on ophthalmoscopic examination no lenticular changes could be detected. Even though the fogginess in the lens seemed to be associated with severe diarrhea, the matured cataract developed in the animals that showed the least intestinal disturbance. The initial changes in the lens appeared in from seventy to ninety-four days, but matured cataracts developed in only seven animals in the span of 140 days. Eight animals fed a diet containing 50 per cent galactose maintained good health. When the rats had been on the diet for from eleven to fourteen days, the lens of each eye showed a cataract. The first visible signs of lenticular disturbance were manifested by a light pink eye and a "milk white" fogginess of the lens. Ophthalmoscopic examination showed no opacities at this stage. The lens was tumescent. Subsequently a few striae were seen, and these were followed by a complete opacification of the nucleus of the lens. On continuation of the experiment for a few days, the whole lens became opaque. Four animals placed on a diet containing 35 per cent galactose likewise developed cataracts in from ten to fourteen days. A third group of four animals on a diet containing 25 per cent galactose also showed cataracts in from fourteen to twenty days. In all these animals the nucleus showed the opacity first. Four rats (female), two of them 68 days old and two 85 days old, were given a diet containing 50 per cent galactose. All showed white opacities in the lens in about twenty-one days. In contrast to the nuclear development in younger rats, the older animals had cortical cataracts. Two of the animals continued on the diet for five weeks, and definite matured cataracts developed.

California and Western Medicine, San Francisco

43: 393-464 (Dec.) 1935

Sylvatic Plague in California: Discussion of Its Extent in Years 1934 and 1935. K. F. Meyer and B. Eddie, San Francisco.—p. 399.
*Air Conditioning: Its Relation to Upper Respiratory Infections. M. N. Hosmer, San Francisco.—p. 405.
Poliomyelitis: In Vitro Neutralization Tests, Using Normal Adult and Convalescent Human Serums: I. Introduction. Beatrice F. Howitt, San Francisco.—p. 407.
Rôle of Urethra in Female Urology. W. E. Stevens, San Francisco. —p. 411.
Compression Fractures of Spine. W. A. Morrison and R. J. Flamson, Los Angeles.—p. 416.
Intestinal Obstruction: Roentgen and Statistical Study. J. F. Chapman, Pasadena.—p. 419.
Treatment of Varicose Ulcer and Veins. J. M. Schmoele, Los Angeles. —p. 423.
Pigmentation of Metabolic Origin: Its Relation to Autonomic Nervous System. I. Bancroft, Los Angeles.—p. 425.
Results of Treatment of Congenital Luetics with Bismuth Arsphenamine Sulfonate (Bismarsen) for Five Years. W. A. Reilly, San Francisco. —p. 429.

Air Conditioning.—Hosmer declares that air conditioning from a technical standpoint should still belong to the engineers; however, the profession should become more familiar with what is being done so that it may assist in the proper installations for various conditions. The results of various investigators show that each individual patient presents entirely different requirements for the conditions of the air to be supplied. For example, the nursery for the premature infant should be maintained at a relative humidity of from 60 to 65 per cent and a temperature of from 80 to 100 F., depending on the age and weight of the patient. The asthmatic patient responds much more quickly if the relative humidity is kept at 40 per cent. The patient who has a stuffy nose in an atmosphere of high relative humidity responds nicely to a humidity of from 48 to 50 per cent and a temperature of about 68 F. In the extremely dry climates of the Western states it will be necessary, at times, to add water to the circulated air to increase the humidity. Hospitals should be conditioned by the unit system so that individual rooms, or groups of rooms, can be maintained at any desired state. They can accommodate, in this way, any type of patient who may require care. The author presents a brief outline of the subject of air conditioning as it has been developed by the leading ventilating engineers. Its value in the management of diseases of the upper respiratory tract has been shown by many investigators.

V 106
1936

Canadian Medical Association Journal, Montreal

33: 597-716 (Dec.) 1935

Genesis and Development of Brunn's Nests and Their Relation to Cystitis Cystica, Cystitis Glandularis and Primary Adenocarcinoma of Bladder. F. S. Patch and L. J. Rhea, Montreal.—p. 597.
Mechanism of Rotation in Occipitoposterior Positions. J. Mann, Toronto. —p. 607.
Cardiovascular Syphilis: Necropsy Survey. F. E. Cormia, Montreal. —p. 613.
Inadequacy of Present Dietary Standards. F. F. Tisdall, Toronto. —p. 624.
Vinyl Ether Obstetric Anesthesia for General Practice. W. Bourne, Montreal.—p. 629.
*Investigation of Rôle of Anaerobic Streptococci in Infectious Diarrhea in Toronto. Marion M. Johnston and Mildred J. Kaake, Toronto. —p. 632.
Calcium and Hemoglobin: Influence of Cabbage Diet on Hemoglobin of Rabbit. J. Ferguson and A. W. Downs, Edmonton, Alta.—p. 634.
*Poisoning from Phenobarbital (Luminal): Report of Fatal Case and Review of Fatalities Previously Reported. E. P. Scarlett and D. S. Macnab, Calgary, Alta.—p. 635.
Value of Speech Training in Cleft Palate and Other Mouth Conditions. E. E. Scharfe, Montreal.—p. 641.
Paroxysmal Neuralgia of Tympanic Branch of Glossopharyngeal Nerve: Report of Case Relieved by Intracranial Section of Glossopharyngeal Nerve. T. C. Erickson, Montreal.—p. 647.
Twenty Years' Experience with Artificial Pneumothorax: Study of Four Hundred and Sixty Cases. A. F. Miller, C. J. W. Beckwith, A. A. Giffin, H. R. Corbett and A. V. Fraser, Kentville, N. S.—p. 650.

Anaerobic Streptococci in Infectious Diarrhea.—During the autumn of 1934 Johnston and Kaake made an attempt to isolate a streptococcus comparable to the species described by Cooper (Streptococcus micro-apoikia-enteritidis) from cases of infectious diarrhea in infants. Cultures were taken from twenty-seven infants less than 2 years of age admitted to the Hospital for Sick Children. Streptococci were isolated from the noses and throats of fifteen, from the feces of two of these, and from the feces of four others whose nose and throat cultures yielded no streptococci. No strains comparable to that described by Cooper were obtained. The strains isolated from the feces were not similar to those isolated from the nose in the two cases in which strains were obtained from both sources. From the feces of sixteen of these infants definitely pathogenic strains of gram-negative bacilli were isolated; from nine others, strains of less well established pathogenicity were cultured. The feces of only two yielded no suggestive species. No streptococci were isolated from these two. Eleven strains of Bacillus dysenteriae Sonne, three of Bacillus dysenteriae Hiss-Russell, three of Bacillus dysenteriae Schmitz, two of Bacillus asiaticus, three of Bacillus Morgani, two of Bacillus pyocyaneus and thirteen unidentified strains were cultured. The significant species occurred alone or in mixtures of two or more, sometimes associated with species of less well accepted pathogenicity. The six fecal streptococcus strains were grown in broth for eighteen hours. Then 2.5 cc. of each of these cultures was injected intravenously into young healthy rabbits the feces of which had yielded no streptococci similar to the strains about to be injected. No effect was produced on the animals.

Poisoning from Phenobarbital.—Scarlett and Macnab state that even a cursory review of the literature indicates a steadily increasing number of toxic reactions to the barbituric acid derivatives. So prevalent have these reactions become that in some countries measures to control the prescribing of barbiturates are under consideration. Reports in the literature indicate an increasing incidence of skin eruptions from phenobarbital. The dosage in these cases has usually been 1½ grains (0.1 Gm.) at bedtime, has in no instance exceeded this dosage, and in some instances has been less. The prevalence of these eruptions has been such that in the last six months the authors have felt obliged to discontinue the use of phenobarbital, except in selected cases, such as epilepsy. The indiscriminate use of the barbiturates is to be avoided. Special attention should be paid to the following points: 1. Senile patients require a smaller dose. 2. Debilitated patients tolerate the drug poorly. 3. Patients with arteriosclerosis, hypertension or myocardial disease may react poorly to the shorter acting barbiturates, because of the marked effect on the blood pressure, and may complain of vertigo and ataxia. 4. Severe genito-urinary disease may be an absolute contraindication. 5. Defective liver function makes anything but small doses inadvisable and continuous administration is to be avoided. 6. Advanced pulmonary disease and, particularly, pulmonary congestion are contraindications to the use of the barbiturates before operation because of their action on the respiratory center. 7. Severe toxemia from sepsis increases the susceptibility to these drugs.

Canadian Public Health Journal, Toronto

26: 523-574 (Nov.) 1935

Cardiovascular Renal Conditions as Public Health Problem. H. C. Cruikshank, Toronto.—p. 523.
History and Activities of the National Health Division of the Department of Pensions and National Health. J. J. Heagerty, Ottawa, Ont. —p. 528.
Parasitology and Its Relation to Public Health in Canada. T. W. M. Cameron, St. Anne de Bellevue, Que.—p. 541.
The Medical Officer of Health and School Health in a Small Urban Municipality. W. H. Birks, Bowmanville, Ont.—p. 548.
Mortality from Respiratory Diseases Excluding Tuberculosis (Ontario, 1880-1931). Mary A. Ross, Toronto.—p. 552.

Colorado Medicine, Denver

32: 953-1024 (Dec.) 1935

Oral Pathology in Relation to Systemic Disease. T. E. Carmody and G. W. Smith, Denver.—p. 964.
Nonoperative Care of Head Injuries. P. Work, Denver.—p. 968.
Surgical Management of Severe Head Injuries. J. E. A. Connell, Denver.—p. 971.
Thyroid Crisis: Report of Case Following Operation. G. F. Netherton, Denver.—p. 975.
Frequency and Duration of Modern Football Injuries. G. K. Cotton, Denver.—p. 979.

Iowa State Medical Society Journal, Des Moines

25: 635-710 (Dec.) 1935

Rôle of Psychotherapy in General Medicine. A. E. Bennett, Omaha. —p. 635.
The Heart and Athletics. R. S. Grossman, Marshalltown.—p. 638.
The Heart in Bronchial Asthma. W. D. Paul, Iowa City.—p. 643.
Heart Disease in Pregnancy. R. I. Theisen, Dubuque.—p. 648.
Reasons and Technic for Lobe Differential Count. F. H. Lamb, Davenport.—p. 651.
Some New Factors in Diagnosis of Acute Appendicitis. C. N. Cooper, Waterloo.—p. 654.
Intra-Urethral Prostatectomy. R. Weston, Mason City.—p. 658.
*The Management of Functional Constipation. A. A. Schultz, Fort Dodge.—p. 661.
Acute Staphylococcic Kidney. G. V. Caughlan, Council Bluffs.—p. 664.
Congenital Absence of One Kidney. F. H. Entz, Waterloo.—p. 668.
Adequate Records and General Office Management. E. F. Hagen, Decorah.—p. 671.

Management of Functional Constipation.—Schultz says that no case of constipation can be properly managed unless one ferrets out the various etiologic factors. Preventive treatment must begin in childhood, and all children should be taught the proper intestinal hygiene, the dangers of neglecting nature's call, the importance of diet and the hazards of cathartics. A complete history is of great importance, including consideration of the personality, habits of eating, diet, water intake, frequency and kind of cathartics, exercise and rest. Organic disease of the intestine and constitutional disease must be eliminated as a cause. The stool should be carefully investigated in all cases. The treatment of the patient himself should begin with psychotherapy. All fixed ideas and fears that in themselves inhibit intestinal action must be eradicated and the absolute confidence of the patient obtained. The initial step in the treatment is to withdraw all cathartics, and the first few days will be the trying period for the patient. The essentials in the treatment of functional colonic constipation are education, diet and regulation of habits. A definite routine must be established and followed day in and day out. The diet ordered will depend entirely on whether the intestine is hypertonic or atonic. It should produce sufficient residue to provide normal stimulation to peristalsis, but not be so bulky and irritating as to cause colonic spasm. In treating the atonic intestine the main consideration is to increase the quantity of vegetable foods, organic acids and sugar providing both chemical and mechanical stimulation. An increased amount of fat for the undernourished individual is valuable. Patients who have developed the spastic type of constipation must be put on a smooth diet with a relatively low residue, and the vegetables ordered should preferably be puréed and raw fruits and vegetables interdicted. Stewed fruits are frequently well taken. These people require psychotherapy, nerve sedatives, tincture of belladonna or atropine to

allay spasm, and warm applications to the abdomen. They should forget their worries at meals, eat no large meals, take a light lunch between meals and avoid excessively hot or cold beverages. Exercise stimulates intestinal movements.

Journal of Industrial Hygiene, Baltimore

17: 243-308 (Nov.) 1935

Modification of Nielsen Method of Artificial Respiration. C. K. Drinker and L. A. Shaw, Boston.—p. 243.
Heat Cramps and Heat Prostration in Hot Industries. P. M. Starkov and J. V. Jikesh, Sverdlovsk, Ural, U. S. S. R.—p. 247.
Air-Borne Infection and Sanitary Air Control. W. F. Wells, Boston and Cambridge, Mass.—p. 253.
Hygienic Lighting Intensities. M. A. Tinker, Minneapolis.—p. 258.
Rock Wool in Relation to Health. L. T. Fairhall, S. H. Webster and G. A. Bennett, Boston.—p. 263.
Lupus Carcinoma: Report of Unusual Case of Carcinoma Following Injury and Implanted Lupus Vulgaris on Left Upper Extremity. H. Goodman, New York.—p. 276.
Observations of Physical Efficiency in Ionized Air. C. P. Yaglou, Boston.—p. 280.
Effect of High Concentrations of Light Negative Atmospheric Ions on Growth and Activity of Albino Rat. L. P. Herrington and K. L. Smith, New Haven, Conn.—p. 283.
Mineralogy of Asbestos Dust. C. S. Hurlbut Jr., Cambridge, Mass., and C. R. Williams, Boston.—p. 289.
Pneumoconiosis in the Pittsburgh District, Based on Study of Twenty-Five Hundred Postmortem Examinations Made in Pittsburgh Hospitals. Lucy Schnurer, W. C. Allison, C. M. Boucek and S. R. Haythorn, Pittsburgh.—p. 294.
Technic for Skin Irritation Tests: Technic for Determining Irritating Effects of Chemical Compounds. J. L. Etchells and F. W. Fabian, East Lansing, Mich.—p. 298.

Michigan State M. Society Journal, Grand Rapids

34: 747-812 (Dec.) 1935

Status of Essential Hypertension Problem. S. M. White, Minneapolis.—p. 747.
Serum Treatment of Lobar Pneumonia: Report on Use of Felton's Serum in Detroit from Feb. 25 to June 1, 1935. A. E. Price, Detroit.—p. 757.
The Art of Medical History Taking. H. C. Saltzstein, Detroit.—p. 762.
Diagnosis of Pituitary Disease: Analysis of Twenty Cases. A. Farbman, Detroit.—p. 767.
*Immune Globulin Used as Preventive and Modifier of Measles. G. M. Laning and T. N. Horan, Detroit.—p. 772.
Osgood-Schlatter's Disease: Principles of Treatment with Review of Three Cases. R. D. Fairchild, Detroit.—p. 774.
Active Immunization of Children Against Acute Anterior Poliomyelitis with Kolmer's Vaccine. H. Roehm, Birmingham.—p. 775.
Dinitrophenol Cataract: Case History. W. Z. Rundles, Flint.—p. 777.
Cancer Survey of Michigan. F. L. Rector, Evanston, Ill.—p. 778.

Immune Globulin (Human) as Preventive of Measles.—Laning and Horan used immune globulin (human), an extract prepared from the placenta, in ninety-three cases. Immune globulin (human) can be given shortly after exposure to prevent measles and from seven to ten days after exposure to modify measles. Immune globulin (human) was used in nineteen cases to prevent measles. These included children who had recently been ill from infections of the respiratory tract, ear and lymph glands, or to whom, for economic reasons, it was important that there should be no sickness in the family at the time. Doses of 2 cc. (seven cases) and 10 cc. (twelve cases) were given from one to four days after a known exposure. Twelve of these children did not develop measles; in the remaining seven the course of the illness was light, with eruption, a degree of fever and a transient conjunctivitis and nasopharyngitis. There were no complications. Immune globulin (human) for modifying measles was given in 2 cc. doses in seventy-four cases. Since a light case of measles will confer a permanent immunity on the child, this procedure is the method of choice. The course of measles was light in sixty-eight cases and moderate in six cases, with an intermittent fever of from 102 to 103 F. for three days preceding and a continuous fever for three to four days after the appearance of the eruption. There were no severe cases and no complications among those who were given immune globulin (human). Of forty-six patients to whom no immune globulin (human) was given the course of the measles was light in nine, moderate in eleven and severe in twenty-six cases, often beginning with a chill, a fever of from 104 to 105 F., a profuse eruption, severe conjunctivitis and swelling of the nasal mucous membrane, persistent cough, difficult to control, and sometimes toxic vomiting, headache and pain in the abdomen. Serious complications developed in fifteen of these cases. There were two deaths.

New Jersey Medical Society Journal, Trenton

32: 683-744 (Dec.) 1935

Infantile Glaucoma. W. G. Mengel, Camden.—p. 689.
Stuttering; Nervous Maladjustment, Not a Speech Defect. J. S. Greene, New York.—p. 693.
Intra-Ocular Nonmagnetic Foreign Bodies, with Especial Reference to Their Removal. G. H. Cross, Chester, Pa.—p. 697.
The Essex County Medical Society. J. F. Condon, Newark.—p. 701.
The Union County Medical Society. E. S. Krans, Plainfield.—p. 704.
The Academy of Medicine and the Doctor. A. W. Bingham, East Orange.—p. 707.

New York State Journal of Medicine, New York

35: 1241-1296 (Dec. 15) 1935

Genetics and Clinical Medicine. G. Draper, New York.—p. 1241.
Treatment of Pneumonia. A. F. Chace, New York.—p. 1263.
*Cutaneous Calcinosis. M. J. Costello, New York.—p. 1266.

Cutaneous Calcinosis.—Costello treated a case of the metabolic form of cutaneous calcinosis over a period of six years. The patient also has multiple hereditary telangiectasis with recurring hemorrhage. Raynaud's phenomena, painful calcium nodules in the skin, a lipoma, arthritis, a high blood calcium when first observed, followed by a normal blood calcium later, and a leukopenia are the high lights of the study. Trauma, local nutritional disturbance caused by Raynaud's disease, increased muscular activity and changes in the blood calcium, phosphorus and cholesterol are among the known factors influencing the deposition of calcium in the skin. The exact mechanism is imperfectly understood. The present case differs from the others reported in that the blood calcium was high in the beginning and gradually returned to normal. In the treatment of cutaneous calcinosis, it is first necessary to make the patient as comfortable as possible by incising the skin over the painful nodules under local anesthesia. It is best to make an incision and then try to remove the nodule in its entirety. Not infrequently, before this is possible, a creamy material is discharged and the calcium stone itself becomes fragmented on endeavor to remove it. The author has found it necessary to curet thoroughly the base, the surrounding skin and the sides of the wound to break up the calcium infiltration of the skin. The wound is allowed to drain without suture. It heals slowly, sluggishly discharging small granules of calcium. It is important to remove all the particles of calcium, because, if any are allowed to remain, they will act as a "catcher" for the further deposition of calcium salts, and the operation will have to be repeated. Large doses of x-rays, both filtered and unfiltered, had no effect in arresting the progress of a lesion or in curing it. A calcium plaque on the right knee of the patient, about 30 mm. in diameter, became definitely softer with a tendency to break down after ten diathermy treatments. Salicylates given for arthritic pains gave moderate relief. Disodium phosphate had no effect on the lesions. There is a possible relationship between the arrest in the development of new nodules and the dietary suggestions, such as fat, salt and calcium poor diet. In the last ten years there have occurred on the face, neck, chest, extremities and mucous membranes of the lips a number of sparsely distributed, smooth, nonelevated, rectangular and oval patches of telangiectasia. They vary in size from a pin point to about 24 mm. The bony configuration is somewhat asymmetrical and there has been gradual thickening of the features.

Oklahoma State Medical Assn. Journal, McAlester

28: 437-472 (Dec.) 1935

Indications for Anesthetics: Cyclopropane—New Gas Anesthetic—Report of One Hundred and Twenty Cases. G. S. Mechling, Oklahoma City.—p. 437.
Id.: Sodium Evipal. J. H. Robinson, Oklahoma City.—p. 439.
Id.: Nupercaine Infiltration Anesthesia. F. M. Lingenfelter, Oklahoma City.—p. 440.
Id.: Inhalation Anesthesia by Ether. L. Long, Oklahoma City.—p. 440.
*Some Observations on Treatment of Gonorrhea in the Male, with Especial Reference to Corbus-Ferry Filtrate. H. M. Spence, Ponca City.—p. 442.
Points in Diagnosis of Cancer. B. B. Coker, Durant.—p. 447.
Eugenic Sterilization as Applied to Patients in Hospitals for Insane. C. T. Steen, Norman.—p. 450.
One Answer to State Medicine. C. Puckett, Oklahoma City.—p. 452.

Corbus-Ferry Filtrate in Treatment of Gonorrhea.—Spence studied the effect of Corbus-Ferry filtrate in fifteen cases of gonorrhea in the male. The method was used only for patients who could report regularly and frequently to the

V 106
1936

clinic, were cooperative in conduct and were really desirous of getting well. Every effort was made to adhere to the details of administration and dosage suggested by the manufacturers. He states that for all practical purposes the Corbus-Ferry filtrate has been unsatisfactory and decidedly inferior to the Pelouze treatment of gonorrhea in the male. Of many methods tried by him, the Pelouze treatment has consistently yielded the best results. In no type of therapy has he ever had so many complications (swelling of the entire penis and urethra with a phlebitis of the dorsal vein, acute prostatitis, acute epididymitis, hematuria, tenesmus, partial retention and rise in temperature) in so short a period of time as when using the filtrate.

Pennsylvania Medical Journal, Harrisburg

38: 149-222 (Dec.) 1935

Prevention of Dental Caries and Improvement of Health by Dietary Means. F. F. Tisdall, Toronto.—p. 149.
Recent Trends in Medical Economics. F. F. Borzell, Philadelphia. —p. 152.
Boarding-Out of Mental Patients. W. C. Sandy, Harrisburg.—p. 155.
*Phlyctenular Disease and Vitamin Deficiency. L. G. Redding, Scranton. —p. 158.
Allergic Migraine. L. Tuft, Philadelphia.—p. 162.
The State Department of Health and the Child. Edith MacBride Dexter, Harrisburg.—p. 166.
Stricture of the Male Urethra. J. L. Whitehill, Beaver.—p. 170.
Diagnosis and Treatment of Pellagra. G. J. Busman, Pittsburgh. —p. 173.
The Philadelphia Maternal Mortality Report: Discussion of the Hospital Problems. C. B. Lull, Philadelphia.—p. 176.
Essential Considerations of Mental Deficiency. A. Laird, Polk.—p. 179.

Phlyctenular Disease and Vitamin Deficiency.—Three years ago Redding observed that he was not seeing any cases of phlyctenular disease in his office or dispensary practice. This observation was confirmed by several colleagues. Consequently, statistics were gathered from the Wills Hospital, New York Eye and Ear Hospital, University of Pittsburgh and Massachusetts General Hospital, which show a marked decrease in the last ten years; in the last few years there have been very few cases in any of these hospitals. With the nutritional cause in mind it seemed that the only possible factor that could affect the entire populace over such a wide area at about the same time was that of feeding. It followed that the particular change in feeding had been the use of the vitamins. This was brought about first by their discovery, then by the education of the physician, and through him the public. It was about this time that the almost universal use of cod liver oil and orange juice in the dietary of children was started. Finally, there was a demand on the merchant for these articles and, as a further result, the increased use of refrigeration so that practically all vitamin-containing foods could be obtained cheaply the whole year round. In addition, canners were obliged to learn how to preserve the vitamin content of their products. Statistics received from the University of Vienna show an increase. This was to be expected, because it is well known that Europe has not kept apace with America in the use of refrigeration or the year-round use of vitamin-containing foods. The clinical picture and the microscopic observations of phlyctenular disease in man and in rats fed on a diet free of vitamin A are similar. Since arriving at this concept of the disease the author has had the opportunity to treat only a few cases, but in those that were treated quicker results were obtained by tablespoonful doses rather than by teaspoonful doses of cod liver oil.

Philippine Islands Med. Association Journal, Manila

15: 583-636 (Nov.) 1935

Heterophyidiasis: II. Ova in Sclerosed Mitral Valves with Other Chronic Lesions in Myocardium. C. M. Africa, W. de Leon and E. Y. Garcia, Manila.—p. 583.
New Phase in Medical Education. F. W. Co-Tui, New York.—p. 593.
*Some Experiences in Treatment of Leprosy by Artificially Induced Fevers: Preliminary Report. B. Nocht, Hamburg, Germany, and F. I. Velasco, Manila.—p. 602.
Equipping Small Waterworks Laboratory. P. I. de Jesus, Manila. —p. 610.
Human Glanders in the Philippines: Additional Report. M. V. Mallari and A. I. Mallari, Manila.—p. 616.

Treatment of Leprosy by Induced Fevers.—Nocht and Velasco assert that prolonged, repeated, artificially produced rises of temperature for a duration of from eight to ten hours and as high as 40 C. (104 F.) and more are well tolerated by leprous patients and do not produce any dangerous or inconvenient by-effects or after-effects in lepers of good general health. There is also no impairment of the general health. However, these attacks of raised temperature, even if repeated and prolonged, are followed only in exceptional cases by marked improvement of the leprous process. In most cases the process has been neither favorably nor unfavorably influenced by the attacks of fever. Therefore, in cases of marked improvement in or cure of leprosy by intercurrent infectious diseases, accompanied by fever, or of improvement or cure by a hot bath treatment of leprosy, the cooperation of another still unknown factor or a special condition or phase of the leprous process should be suspected, the study of which might bring progress in the treatment of leprosy. The authors are continuing the treatment with pyrifer (sterilized suspension of a nonpathogenic bacillus of the coli group) in some selected clinical types of cutaneous leprosy and will report the results later.

Philippine Journal of Science, Manila

58: 153-298 (Oct.) 1935. Partial Index

Antigenic Properties of Cholera Vaccine Prepared by the Philippine Bureau of Science. K. Sugino, Manila.—p. 153.
Philippine Ginger in Relation to the United States Food and Drugs Act. J. Marañon and Elena Caguicla, Manila.—p. 171.

Rhode Island Medical Journal, Providence

18: 179-192 (Dec.) 1935

Aputrid Pulmonary Necrosis: Report of Case. J. Greenstein, Providence. —p. 179.
Our Deafened Children and How We Are Caring for Them. G. Berry, Worcester, Mass.—p. 182.

South Carolina Medical Assn. Journal, Greenville

31: 227-258 (Dec.) 1935

Surgical Judgment in Our Approach to the Acute Abdomen. L. Guerry, Columbia.—p. 227.
Surgery in Roper Hospital. R. S. Cathcart and J. I. Waring, Charleston. —p. 231.
Head Injuries: Their Management and Treatment. T. Fay, Philadelphia.—p. 233.
Some Interesting Case Reports. G. P. Neel, Greenwood.—p. 243.

Southern Surgeon, Atlanta, Ga.

4: 379-464 (Dec.) 1935

Congenital Anomalies of Gastro-Intestinal Tract Causing Obstruction. J. K. Simpson, Jacksonville, Fla.—p. 379.
Surgical Consideration of Tonsils and Adenoids. W. A. Weldon, Glasgow, Ky.—p. 393.
Experiences with Well Leg Traction Apparatus. J. W. White, Greenville, S. C.—p. 396.
*Diagnosis and Treatment of Primary Carcinoma of Lung. I. A. Bigger, Richmond, Va.—p. 401.
Thyroid Disease in the Negro. I. Cohn, New Orleans.—p. 416.
Acute Appendicitis at the Extremes of Life: Based on Analysis of Four Hundred and Twenty-Six Cases in Children Under Twelve, and Two Hundred and Twenty-Four Cases in Adults Over Forty Years of Age. U. Maes and Elizabeth M. McFetridge, New Orleans.—p. 422.
Gross Diagnosis of Mammary Cancer. E. L. Bishop, Atlanta, Ga. —p. 438.
Cancer of Lip and Intra-Oral Mucous Membrane. L. W. Frank, Louisville, Ky.—p. 444.

Primary Carcinoma of Lung.—Bigger states that the early diagnosis of carcinoma of the lung is difficult, as there are no pathognomonic signs or symptoms; but a cough productive of mucoid or blood-tinged sputum that does not contain tubercle bacilli should be considered suggestive. Pain in the chest, especially when associated with recurrent or persistent atelectasis, is also significant. Patients presenting such symptoms should certainly be thoroughly investigated, for only in this way will an appreciable percentage of cases of cancer of the lung be diagnosed before the disease has become hopelessly advanced. Since irradiation, both by radium and x-rays, has proved ineffectual, patients diagnosed sufficiently early should be given the benefit of the doubt and an attempt made to excise the diseased lung tissue. Two such cases treated surgically are reported. In the first it was necessary to do a total pneumonectomy in the presence of extensive pleural infection, and this was followed by a suppurative pericarditis, which eventually caused death. In the second case the entire local growth was removed by lobectomy, but two enlarged hilus glands removed with the lobe showed small groups of metastatic carcinoma cells. No other suggestive glands were discovered and there has so far (one year) been no evidence of recurrence.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Physical Medicine, London

10: 105-124 (Nov.) 1935

Modern Occupational Therapy for Tuberculous. P. Varrier-Jones.—p. 107.
Treatment of Lupus Vulgaris with Artificial Light. J. E. M. Wigley.—p. 108.
Light and Pulmonary Tuberculosis. J. E. Wood.—p. 110.
Present Position in Treatment of Tuberculous Joints. H. J. Seddon.—p. 112.

British Medical Journal, London

2: 983-1030 (Nov. 23) 1935

Intracranial Tumor: Diagnosis, Prognosis and Treatment of Brain Tumor Fifty Years Ago and Today. E. Bramwell.—p. 983.
Treatment of Chronic Suppurative Otitis Media. L. G. Brown.—p. 986.
*Hypertensive Cerebral Attack. D. McAlpine.—p. 990.
Atypical Megaloeytic Anemia. G. D. Kersley.—p. 994.
*Contribution to Treatment of Burns. A. C. Turner.—p. 995.
Cutaneous Cancer in Cotton Mule Spinners: Note. E. D. Irvine.—p. 996.

Hypertensive Cerebral Attack.—McAlpine asserts, after studying a number of cases, that they were found to fall into one of two groups, depending on the presence or absence of cerebral edema. Occasionally a case showed features appertaining to both groups. The term hypertensive cerebral attack has been selected to describe these symptoms. The factor common to the two varieties of cerebral attacks is a raised blood pressure. The actual precipitating cause seems to be a further rise in blood pressure. This rise may be only temporary. In the type of hypertensive cerebral attack without evidence of cerebral edema the sudden rise in blood pressure induces spasm of cerebral vessels with resulting ischemia. The symptoms that follow probably depend not only on the degree of spasm but also on the situation and number of vessels affected. The second factor that seems to predispose a hypertensive patient to convulsions is the previous occurrence of a cerebral thrombosis, by virtue of the local circulatory disturbance consequent on such a lesion. The type of patient under consideration is the victim of high blood pressure and diffuse hyperplastic sclerosis in whom the small arteries and arterioles in the body are widely affected. In the form accompanied by cerebral edema the immediate outlook is favorable, provided steps are taken to combat the increased intracranial pressure. As long as the nitrogenous contents of the blood remain within normal limits, the immediate prognosis is good. As the essential factor in both forms of cerebral attack is believed to be a sudden additional rise in blood pressure accompanied by widespread vasoconstriction, treatment should be directed toward a reduction in pressure by the speediest methods. Good results have been obtained by liberal venesection; the use of French's apparatus is advocated. In the form of hypertensive cerebral attack with signs of cerebral edema, venesection will help toward a reduction in intracranial pressure. Intravenous injection of hypertonic sodium chloride solution will diminish headache. Lumbar puncture should also be carried out with the purpose of determining the extent to which intracranial pressure has risen, and as a therapeutic measure. If the cerebrospinal fluid is under moderately increased pressure (approximately 200 to 250 mm. of water) it is safe to remove from 10 to 20 cc. of fluid. If increased headache follows, no further lumbar puncture should be done. In the form of attack without signs of cerebral edema, lumbar puncture and intravenous hypertonic sodium chloride solution are valueless. Venesection is the most important measure. An inhalation of amyl nitrite may halt convulsions. In both forms an enema should be given at the first possible moment. The likelihood of further attacks may be lessened by the continuous use of vasodilators with a hypnotic, such as phenobarbital.

Treatment of Burns.—Turner gives the following disadvantages of tannic acid treatment of burns: 1. The coagulum is coarse, tough and not transparent. Any pus formation beneath it is difficult to diagnose. A very coarse type of granulation tissue will be found beneath the scab, which is difficult to control and ultimately tends to produce extensive scarring. 2. Tannic acid is destructive to clothing and bed linen. This necessitates the use of rubber sheeting to protect the bed, which interferes with evaporation. 3. Tannic acid becomes unstable rapidly in the aqueous solution required for use. After a trial of several drugs the author selected mercurochrome because it does not precipitate protein and can therefore be said to be an effective antiseptic in the presence of protein, the crust formed is thin and transparent, bed linen is not destroyed, it is nonirritating to the tissues, a 2 per cent aqueous solution is stable for an indefinite period and epithelization under the scab takes place rapidly. The treatment of shock and exhaustion are dealt with on generally accepted lines. No general anesthetic is given. Large doses of morphine or other opiates are recommended and are usually quite effective. All dead tissue is stripped from the burnt area and foreign material is removed. The denuded area should be swabbed with absorbent cotton soaked in physiologic solution of sodium chloride at about 100 F. until all débris has been removed. When the general toilet of the area has been completed, it is swabbed with a 2 per cent aqueous solution of mercurochrome. The surface is then dried with the assistance of an electric hair drier, an ordinary electric radiator or an electric cradle, provided it has ventilation holes along the top. Desiccation takes place rapidly. The first day four applications are recommended, the second day three and the third day two. The area is dried after each application and is always kept exposed to the atmosphere. The crust is likely to disintegrate. Therefore if the patient lies on a portion of the burned area he should be turned frequently and the freest ventilation possible should be provided. Should there be any local collection of pus, the crust should be freely removed from the area, the area swabbed with physiologic solution of sodium chloride as before and the mercurochrome treatment reapplied. Patients treated with mercurochrome have less general reaction during convalescence than those treated with other agents, while the amount of pain and discomfort compares well with that of any other method.

East African Medical Journal, Nairobi

[12]: 227-260 (Nov.) 1935

Loose Stools, with Particular Reference to Amebiasis: Part I. Method of Investigation and Bacillary Dysentery. H. C. Trowell.—p. 229.
Human Case of Abortus Fever Due to Laboratory Infection. H. J. O. Burke-Gaffney.—p. 235.
Evidence of Successful Destruction of Schistosomes. F. G. Cawston.—p. 244.
Native Diet in Zanzibar. W. H. Smith and E. M. Smith.—p. 246.

Edinburgh Medical Journal

43: 633-706 (Dec.) 1935

Histologic Study of Normal Mamma in Relation to Tumor Growth: II. Mature Gland in Pregnancy and Lactation. E. K. Dawson.—p. 633.
Medicine in Early Greek Mythology. J. D. Gilruth.—p. 661.

Indian Medical Gazette, Calcutta

70: 601-660 (Nov.) 1935

Disorders of Digestion: Commoner Digestive Disorders of Children in India. E. H. V. Hodge.—p. 601.
Tuberculosis of Mammary Gland. A. N. Goyle, K. G. Krishnaswamy and A. Vasudevan.—p. 609.
Nasal Conditioning. J. R. Roberts.—p. 612.
Difficulties in Bacteriologic Diagnosis of Cholera Vibrios. S. C. Seal.—p. 614.
*Use of Stramonium for Rigidity and Drowsiness Following Encephalitis Lethargica. H. Stott.—p. 620.

Stramonium for Drowsiness Following Encephalitis.—Stott is of the opinion that the use of stramonium in post-encephalitic conditions, especially for parkinsonian rigidity and mental apathy, has not received the attention it deserves from the profession. With a daily dose of stramonium the patient's life may be rendered comparatively happy. With it he may be enabled to accomplish the fundamental necessities of life, to walk, to dress and to feed himself, to write and even to earn his own living. Without it the patient may be compelled to drag out a crippled and sleepy existence with his daily wants falling as a burden on others. The stramonium must be given continuously in large doses, e. g., half a drachm (2 Gm.) of the tincture three times a day. At the West Park Mental Hospital, London, most of the postencephalitic parkinsonian patients are kept on substantial doses of stramonium tincture for many years. If stramonium is withheld, it is found that the patients relapse rapidly to their former pitiable condition. Stramonium is in common and satisfactory use throughout the British mental and general hospitals.

V 106
1936

Presse Médicale, Paris

43: 1793-1864 (Nov. 16) 1935. Partial Index

Tuberculous Virus Made Obvious by Acetone Extract of Tubercle Bacilli. L. Nègre and J. Bretey.—p. 1798.
Tongue and Stomach. P. Chevallier and F. Moutier.—p. 1801.
Tumor of Carotid Body. P. L. Mirizzi.—p. 1804.
*Black Tumors of Skin. G. Roussy, R. Huguenin and N. Quoc Queyn. —p. 1808.
Raynaud's Disease Predominating in Ear Lobules Cured by Specific Treatment. G. Milian, A. Ravina and L. Périn.—p. 1816.
*Attempt at Antilepral Vaccinotherapy. A. Sézary and G. Lévy.—p. 1818.
Practical Interest of Anatomopathologic Classification of Nephritis. H. Chabanier and C. Lobo-Onell.—p. 1825.
Mitral Lesions and Syphilis. R. Lutembacher.—p. 1830.
Osteitis Fibrosa Deformans of Paget and Sarcoma. P. Banset, J. Delarue and A. Elbim.—p. 1842.

"Black Tumors of Skin."—Roussy and his co-workers use the term black tumors of the skin because they consider it more accurate than melanoma. Tumors other than nevocarcinomas and melanosarcomas may be equally pigmented and equally malignant. The gross aspect sometimes indicates whether a tumor is melanic or is a fibroma or angiofibroma with pigmented stroma. When this is impossible, microscopic examination determines this fact definitely. The differentiation is especially important from the standpoint of prognosis. It is also significant for treatment. The authors have obtained good results in the treatment of black tumors of the skin with electrocoagulation.

Antilepral Vaccinotherapy.—Although fully aware of the theoretical and practical difficulties in treating a chronic disease such as leprosy with a vaccine, Sézary and Lévy report four cases observed by them. They used the microbic form found by Vandremer (which he considers a developmental stage) as their antilepral vaccine. The preparation was sterilized with iodine before being used. In these four cases and three others elsewhere reported the period of observation was long enough to form a provisional opinion of the action of the vaccine. The vaccine employed correctly is harmless and well tolerated. It has an undeniable action on certain manifestations of leprosy, but this action is sometimes lasting and sometimes only transitory. The vaccine has no effect on some of the other manifestations. The favorable action was noted in the painful edematous reactions of the face or limbs, in the phlegmonic element of some cutaneous infiltrations and in iritis (one case). The general condition (except in one instance) was also benefited. It seems that patients become rapidly accustomed to the vaccine and no advantage is hence derived from long series of injections. Thus ten or twelve injections seem to be optimal for each series. In the intervals between injections other preparations, especially chaulmoogra oil, are indicated. The authors feel that the vaccine and chaulmoogra oil affect different manifestations of the disease, and hence their association is advantageous.

Clinica Ostetrica, Rome

37: 705-768 (Dec.) 1935

*Functional Tests of Respiration in Pregnancy. V. Marzetti.—p. 705.
Unilateral Double Tubal Pregnancy: Case in Nulliparous Woman. O. Viana.—p. 717.
Hemoperitoneum Due to Spontaneous Rupture of Uterine Vein at Eighth Month of Pregnancy: Case. S. Roberto.—p. 724.
Combined Calcium and Quinine Treatment in Inflammatory Conditions of Internal Genitalia of Women. E. Marchese.—p. 730.

Functional Tests of Respiration During Pregnancy.—Marzetti made tests for efficiency of respiration in twenty normal pregnant women during the last month of pregnancy and at the end of the first week of the puerperium. They included Rosenthal's resistance test for vital capacity, Monaldi's test of provoked hyperpnea, Flach's test of sustained respiration, the test of voluntary apnea and Gallois's test of expiration of residual air. Rosenthal's resistance test consists in determining the vital capacity thirty times in ten minutes with intervals of a few seconds between determinations. In normal persons the figures for the vital capacity are the same or are increased by the test, while in weak persons they decrease or show marked oscillations. Flach's test consists in recording by graphic tracings the time during which a mercury column in a tube that is raised by an expiratory effort to a level of 40 mm. can be maintained at the same level by sustained expiration. Gallois's test consists in determining the time it takes to count in a natural voice after a deep expiration. The results of the tests of Rosenthal and Monaldi indicated good functions of respiration in both conditions. Those of the tests of Flach and Gallois as well as those of the voluntary apnea indicate a lower function of respiration during pregnancy than during the puerperium, but they are related to the special conditions of the nervous system during pregnancy. The author also determined the alveolar tension and the alkali reserve in ten women of the group in order to ascertain whether there is a tendency toward the development of acidosis during pregnancy. The average figures obtained for the alveolar tension and the alkali reserve were 4.64 and 50.1 per cent respectively, which he considers within normal limits. He concludes that there is no insufficiency of respiration during pregnancy.

Semana Médica, Buenos Aires

43: 1649-1756 (Dec. 5) 1935. Partial Index

*Does a Period of Physiologic Sterility Exist in Women? R. Araya. —p. 1649.
Cyanosis: Physiopathogenesis. M. del Sel and P. Khrfan.—p. 1660.
Congenital Laryngeal Strider: Case. J. R. Diaz Nielsen.—p. 1669.
Roentgen Measurement of Bronchodiaphragmatic Segment of Esophagus. O. F. Noguera and M. H. Moreau.—p. 1676.
Hemorrhagic Pancreatitis in Child. E. Sujoy.—p. 1687.
Sesamoid Bones. M. G. R. Malfatti.—p. 1693.

Physiologic Sterility in Women.—Araya reviews the literature and discusses the scientific principles of the theory on the existence of a period of physiologic sterility in women and states that they are erroneous. Only 60 per cent of the women reported in the literature and seen by the author had the twenty-eight day menstrual cycle on which the calculations of the theory are based. The cycle frequently is irregular even in the same woman, ovulation may take place at any time during the cycle and the corpus luteum is found all through it. The results of the removal of a ripe corpus luteum at any time during this period prove that its presence and maturation do not play a distinct part in the onset of menstruation or (as Knaus stated) on the contractility of the uterus. The fluidification of the cervical mucus takes place at irregular intervals during the cycle, according to the observations of Devraigne, Seguy and Brandwein. The existence of a pregravidic condition of the uterine mucosa is not necessary to the nidation of the egg after its fertilization, and the fact that women who had only one coitus during the cycle or in whom artificial fecundation took place became pregnant proves that pregnancy may take place at any time during the cycle. The life of the spermatozoa is long enough to enable them to wait for the production of ovulation in order to fertilize the egg. The length of life of the egg, although unknown at present, may be calculated at about three days. The author concludes that there is not enough proof of the existence of a physiologic period of intermenstrual sterility in women.

Beiträge zur Klinik der Tuberkulose, Berlin

87: 141-226 (Nov. 22) 1935

*Immunization Against Tuberculosis by Inhalation of Killed Tubercle Bacilli. N. von Westenrijk.—p. 141.
Pulmonary Anthracosis Simulating Pulmonary Tumor. Herta Gut. —p. 157.
Improved Dry Pneumothorax Apparatus. Béla Dubóczy.—p. 166.
Cerebral Tuberculosis and Its Position in Hematogenic Tuberculosis. O. Guell and E. Uehlinger.—p. 169.
Is Arneth's Method or Hemogram Method Better Suited for Practical Estimation of Tuberculosis? V. Schilling.—p. 211.
Spontaneous Pneumothorax and Its Treatment in Course of Pneumothorax Treatment and Causistics. T. Viegener.—p. 221.

Immunization by Inhalation of Killed Tubercle Bacilli.—Westenrijk calls attention to his first report on immunization by inhalation of killed tubercle bacilli in the *Beiträge zur Klinik der Tuberkulose* (83:515 [Oct. 24] 1933; abstr. THE JOURNAL, Feb. 3, 1934, p. 412) and also mentions other investigators who studied this problem. In this paper he describes his second and third series of experiments. In the second series he sought to determine what method of administration of the bacillary vaccine is most efficient, the spraying of dry bacillary powder alone or combined with a fluid spray, or, as was done in the first experiments, the spraying of a bacillary suspension. He found that the latter gives better results than

the former methods. In the third series of experiments he used only the spray of bacillary suspension. It was the object of this series of experiments to determine the optimal dose; that is, the quantity of bacilli producing the best results. The author recommends for rabbits ten or twelve inhalations of a suspension of 1 mg. of killed tubercle bacilli in 1 cc. of a sodium chloride solution. He concludes that these experiments proved that by means of inhalation of killed tubercle bacilli it is possible to increase the resistance against inhalation tuberculosis in rabbits (and eventually in human subjects).

Deutsche Zeitschrift für Chirurgie, Berlin

245: 697-793 (Nov. 23) 1935. Partial Index

Utilization of Sacral Hernia Developing After Kraske Operation for Purpose of Bringing Down the Sigmoid. E. Ebner.—p. 707.
Pathology and Symptoms of Testicular Tumors. L. Findeisen.—p. 717.
*Frequency and Significance of Diagnostic Errors in Ulcer and Cancer of Stomach and Duodenum. H. von Haberer.—p. 745.
Nervous Control of Thyroid and Adrenal. P. Sunder-Plassmann.—p. 756.
*Results and Hazards of Primary Excision and Suture of Soft Tissue Injuries. F. Schüle.—p. 770.

Diagnostic Errors in Gastric Ulcer and Cancer.—Von Haberer states that differential diagnosis between a callous ulcer and carcinoma of the stomach and duodenum is not always possible. The percentage of errors of this type has not been reduced in his material in spite of considerable advances in the clinical and roentgenologic studies and of the experience gained at the operating table. In the 3,125 gastric resections performed by the author, 180 diagnostic errors of this type were committed. He feels that further reduction in the percentage of errors could be brought about by a reliable cancer test, which unfortunately does not exist at present. In his experience malignant degeneration of an originally benign gastric or duodenal lesion occurred with sufficient frequency to influence one's attitude toward the type of operative intervention. He reports a case in which a benign (ulcer) and a malignant lesion coexisted side by side in the same stomach and concludes that extensive resection in the presence of an ulcer is not only justified but imperative. It is to be regarded as a prophylaxis against carcinoma and, provided no vital contraindications exist, should always be preferred to the palliative operations for the exclusion of the ulcer.

Primary Excision of Soft Tissue Injuries.—Schüle reports a study of 6,154 controlled cases of trauma of the soft tissues treated by primary excision and suture at the Second Emergency Station of Vienna from 1930 to 1934. Of these, 97.04 per cent healed by primary intention, 2.81 per cent by secondary intention and 0.15 per cent developed grave complications leading to death or amputation. A comparison with a group of 1,114 cases treated by the conservative method from 1922 to 1926 showed that the incidence of untoward results, such as death or amputation, was three times as great. The greater safety of the method of primary excision with suture depends on the avoidance of a secondary infection. Further improvement in this method implies more painstaking excision of the traumatized tissues and insistence on rest for the injured part. The method likewise recommends itself on cosmetic and economic grounds.

Klinische Wochenschrift, Berlin

14: 1705-1736 (Nov. 30) 1935. Partial Index

Pharmacologic Modification of Heart Action in Kymogram. K. Heckmann.—p. 1709.
*Changes in Hormone Content of Hypophysis with Alternation of Light and Darkness. A. Jores.—p. 1713.
Studies on Influence of Narcotics on Vitamin C Content of Cerebrospinal Fluid and of Brain. F. Plaut and M. Bülow.—p. 1716.
What Isomer Coproporphyrin is Eliminated in Decomposition of Blood? H. T. Schreus.—p. 1717.
By What Endocrine Processes is the Postpartum Onset of Lactation Elicited? E. J. Kraus.—p. 1718.

Hormone Content of Hypophysis and Light and Darkness.—Jores says that observations on cold blooded animals indicate that the alternation of light and darkness produces changes in the hypophysis. Studies on frogs revealed that there is no change in color if the hypophysis or the eyes are removed. He points out that a connection has been discovered between the hypophysis and the eyes and he directs attention to experiments in which he observed that the melanophore content of the blood and of the eyes increases in rabbits after the animals have been kept in the dark for an hour. He also observed considerable fluctuations in the hormone content of the hypophysis, which made it appear likely that this content has some connection with the capacity of the animals to find their bearings in the dark. Since other investigators observed that the hypophysis of frogs contains no melanophore hormone after the animals have been kept in the dark, a discrepancy seemed to exist. For this reason the author decided to investigate the problem once more. He found that the method of extraction of the melanophore hormone is important and observed that, if alkaline extraction is used, the hypophysis shows a greatly increased melanophore content, whereas extraction by means of Ringer's solution reveals a reduction. In further tests he found that the eye and the hypophysis undergo essentially the same changes in cold blooded and in warm blooded animals. When the animals are kept in the dark, the melanophore hormone is present in the hypophysis in an inactive, preliminary stage. If light stimuli reach the eyes, the inactive preliminary form is changed into the active hormone. However, the blood is likewise capable of activating the hormone. It was determined that the melanophore content of the human blood undergoes fluctuations in the course of the twenty-four hour period. The author further reports that he was able to corroborate Rodewald's observation; namely, that the hormone content of the hypophysis depends on the wavelength of the light to which the animal is exposed. In view of the considerable changes that light and darkness produce in one hypophyseal hormone, he considers it probable that some of the other hypophyseal hormones are likewise influenced. He was able to corroborate Rodewald's observation that the intermedin content is not influenced by the change of light and darkness. In this connection he points out that this is a new proof of the fact that intermedin and melanophore hormone are not identical. He studied the effect of light and darkness on the hormones that influence the blood pressure and the uterus and found that these principles are considerably increased under the influence of darkness. He thinks that this explains the higher incidence of births during the night.

Monatsschrift für Kinderheilkunde, Berlin

64: 1-80 (Nov. 12) 1935

Investigations on Creatine and Creatinine Metabolism in Children with Healthy Muscles and in Those with Muscular Deficiencies. H. Kleinschmidt.—p. 1.
*Significance of Age of Parents and of Order of Birth of Children for Mental and Physical Deficiencies. Emilie Kleindienst.—p. 24.
Reversible Broadening of Mediastinal Shadow in the New-Born. S. Liebe.—p. 48.
Congenital Visual Aphasia Following Birth Trauma. T. Brander.—p. 55.

Age of Parents and Order of Births in Connection with Deficiencies of Offspring.—Investigations on forty-eight families that had a large number of children but were apparently free from hereditary defects revealed to Kleindienst that the fifth child is most often involved as regards physical defects. She points out that the mother is generally more than 30 years old at the birth of this child. In investigating the influences responsible for mental deficiencies, she observed that the first child is most often affected. In the forty-eight families, eleven of the first born were found to be mentally weak. Studies on a group of sixty-four weak minded children revealed that almost half of them were first born children. This arouses the suspicion that the frequent impairment of the first born might be related to birth injuries. The author's observations indicate that here again the age of the mother (particularly if she is more than 30) has at least some significance. She points out that other investigators have gained the impression that a rather advanced age of the mother plays a part in the pathogenesis of mental debility of the offspring; nevertheless there are others who maintain that the age of the mother is of no importance for the development of mental or physical deficiencies in the offspring. To explain the high incidence of defects in the first born, it has been pointed out that hemorrhages in the cranium are especially frequent in the first born. In evaluating the practical significance of these studies, the author states that the defectiveness of the first-born child does not necessarily indicate that the family should have no further offspring. If a defective child is born, the heredity should of course be carefully investigated;

V 106
1936

but, if hereditary defects can be excluded, further offspring are not contraindicated unless the difference in the ages of the parents is extremely great or the mother is old or has been weakened by a rapid succession of births.

Münchener medizinische Wochenschrift, Munich

82: 1941-1980 (Dec. 6) 1935. Partial Index

*Experiences with Conservative Treatment of Injuries of Meniscus. M. Zimmermann.—p. 1945.
Value of Past History for Treatment of Pernicious Anemia and Its Evaluation in Members of Army. A. H. Müller.—p. 1947.
What is Cause of Death in Appendicitis? H. Doerfler.—p. 1949.
"The" Cancer Cachexia. D. Kulenkampff.—p. 1955.
*Dietetic Treatment of Diabetic Patients Who Have Gastric Ulcer. A. E. Lampé.—p. 1958.

Conservative Treatment of Injuries of Meniscus.—Zimmermann describes the procedure that is employed for the treatment of injuries of the meniscus at the orthopedic clinic in Munich. The conservative treatment consists of three phases: the preliminary treatment to counteract effusion and forced flexion, the application of an immobilizing bandage, and the after-treatment. The preliminary treatment in case of injury of the median meniscus consists of splint bedding in slightly bowlegged position and in gaiter extension at the ankle (from 4 to 6 pounds). In addition, hot air treatments of thirty minutes' duration are given twice daily and for the night, paraffin bandages are applied, which permit heating to 62 C. without injuring the skin. After from four to eight days the flexed position is usually overcome, as is also the pain at the articular line. If there is still some effusion, the heat application is combined with felt-knee cap compression applied two or three times daily for from three to six days. These measures are usually effective, so that puncture of the knee joint becomes only rarely necessary. However, complete removal of the effusion is highly important and, after it has been accomplished, zinc paste (Unna) with a tricot covering and plaster-of-paris bandages are applied. In order to avoid pressure points, small cushions are saturated with the zinc paste and are placed on the dorsum of the foot and over the ankle joint, the heel, the popliteal space and the head of the fibula. Then, two layers of zinc paste bandage are applied in order to avoid friction of the plaster-of-paris cast that is to be applied over it. At the level of the trochanter and above the ankle, strips of felt (5 cm. in width) are placed tightly around the member so as to avoid slipping of the plaster cast. A correctly fitting felt cap, with a window that leaves the patella free, is placed over the knee and then the plaster bandage is applied in such a manner that both strips of felt are half covered. After the cast has set, a window is cut over the head of the fibula and after thirty-six hours the patient can usually get up. The cast is left on for about four weeks, during which time the patient is generally able to follow his occupation. After the cast is removed, active mobilization of the knee joint is done. The author says that this mode of treatment was employed in thirty-six cases. For the evaluation of the results, only thirty-one patients could be found and twenty-six of these were free from complaint and able to resume their former activities. In five patients the treatment was unsuccessful and two of these have already been subjected to arthrotomy.

Dietetic Treatment of Diabetic Patients with Gastric Ulcer.—Lampé points out that treatment is difficult in the case of concurrence of diabetes and gastric ulcer, because both conditions require dietetic treatment and because the diet required for one condition may eventually exert an unfavorable influence on the other. Since the effective dietetic treatment of a metabolic disorder makes the proper functioning of the gastro-intestinal canal a necessary requirement, the author advises that the dietetic treatment should be directed first against the gastric ulcer. To be sure, the diabetes cannot be entirely disregarded, and the excessive elimination of sugar and acidosis must be avoided by adequate insulin dosage. However, hypoglycemic conditions have to be prevented, because hypoglycemia greatly increases the secretion and motor activity of the stomach. Although insulin prevents excessive deviations of the sugar metabolism, the author does not consider it advisable to give completely uncontrolled quantities of carbohydrates in the course of the ulcer diet. He combines the ulcer cure with rest in bed. In the case of considerable sugar elimination, he begins with a day of fasting, in the course of which weak, lukewarm tea is given at intervals of two hours. Beginning with the second day, increasing quantities of milk are given, at first diluted with tea. Later pure milk is given, which, in order to increase the caloric value, may be mixed with cream. In the case of acidosis, feedings with oatmeal gruel may be intercalated. If possible, the pure milk or the milk-cream diet should be adhered to during the first period of eight days. A milk diet has been known to be beneficial also in diabetic patients. During the second period, cereals and eggs may be added and later buttered toast. Weak cocoa may also be given. During the following period the diet is gradually built up by the addition of small quantities of gruels, potatoes with butter, juices of fresh vegetables and strained vegetables. Eventually, small quantities of fruit juices may be added. Sugar should be restricted, but sugar substitutes may be given. Finally tender fish and meat may be added to the diet. At this stage the dietetic treatment must be adjusted to the diabetes. The quantities of butter and cream must be curtailed and the transition to the fat-deficient vegetable-meat diet must be effected. It is advisable to employ also the other measures that have been found helpful in the treatment of gastric ulcer (local application of heat and injections of atropine and other substances). The proper regulation of the bowels is an important factor in the treatment of patients with ulcer. If surgery becomes necessary in diabetic patients with ulcer, the operation should be preceded by a fasting cure with subsequent oatmeal feedings and the necessary doses of insulin. It is essential that the patient be free from sugar and acetone at the time of the operation. Moreover, the oatmeal and insulin insure a sufficient glycogen supply in the liver, which is a highly important factor in the course of the operation.

Zeitschrift f. Hygiene und Infektionskr., Berlin

117: 403-560 (Nov. 12) 1935. Partial Index

*Studies on "Dissociation" of Tubercle Bacilli. B. Besta.—p. 403.
Studies on Indole-Positive Salmonella Strain. M. Kristensen and F. Kauffmann.—p. 426.
Classification of Gärtner Group. F. Kauffmann.—p. 431.
Immunity Studies on Chicken Cholera: Fate of Chicken Cholera Virus in Immunized Animal Organism. C. Hallauer.—p. 451.
Pneumococcic Immunity Following Gold Therapy. W. A. Collier.—p. 470.

Studies on "Dissociation" of Tubercle Bacilli.—Besta points out that it has been known for a long time that in the artificial culture medium acid-fast bacilli may split up in two types of colonies, the smooth and the rough. This problem of "dissociation" (variation phenomenon) became once more acute by the assertion of Petroff that in human, bovine and avian tuberculosis the smooth form represents the virulent, the rough form the more harmless type. Petroff's statements were especially important, because he concluded that the BCG cultures might eventually revert to the virulent smooth type. The author investigated this problem and found that tubercle bacillus cultures of the bovine and human types can readily be split into two variants, the smooth and the rough forms. However, attempts to split up cultures of avian tuberculosis were several times unsuccessful. It proved impossible to determine the factors that produce these variations, for the variations were sporadic and could not be determined in advance. It proved impossible to detect radical biologic differences between the rough and the smooth variants. The rough and smooth variants of the virulent strains were always of equal virulence and the variants had the same low virulence in the weakened cultures.

Zentralblatt für Gynäkologie, Leipzig

59: 2897-2944 (Dec. 7) 1935. Partial Index

*Intra-Abdominal Hemorrhages Following Normal Delivery. H. Küstner.—p. 2898.
*Experiences with Chemical Pregnancy Reaction of Visscher and Bowman. C. Dolff.—p. 2901.
Two Obstetric Manipulations of the Dyaks in Dutch South Borneo. M. Vischer.—p. 2904.
Chronic Inflammatory Omental Tumor. F. Kovács.—p. 2906.

Intra-Abdominal Hemorrhages Following Normal Delivery.—Küstner gives the history of a woman who developed a severe intra-abdominal hemorrhage following the use of Credé's method for the expulsion of the placenta. Laparotomy

revealed a defect in the fundus uteri, from which blood escaped into the abdominal cavity. Closer inspection disclosed traces of an older uterine fistula. The loose tissue covering this fistula had been torn in the course of Credé's expression, for unfortunately the placenta had been inserted at this site. The earlier history of the woman disclosed that in two previous deliveries she had undergone manual detachment of the placenta and that, following an abortion, a curettage had been done. The author points out that, because of the contraction of the musculature, injuries to the uterine wall, particularly those of the fundus, may result in dehiscence of the scar instead of secure closure. The resulting fistulas, however, are possible only if the injury involves all the layers of the uterine wall. If this is not the case, as for instance in enucleation of subserous or intramural myomas, the danger is not great.

Chemical Pregnancy Reaction of Visscher and Bowman.—Dolff reviews the simple technic of the method of Visscher and Bowman (abstracted in THE JOURNAL, Feb. 2, 1935, p. 431), the results obtained with that method by Visscher and Bowman and also by Menken, and then his own results. He used only the simple technic, not the more complicated modification. He resorted to it in women whose pregnancy had advanced beyond the fourth month, in women who were in the earlier stages of pregnancy, and in cases of extra-uterine pregnancy. Moreover, he made some parallel tests with the Aschheim-Zondek method and examined the urines of healthy nonpregnant women and of nonpregnant women with adnexitis. In order to determine whether the hormone of the anterior lobe of the hypophysis is responsible for this reaction he also made tests with gonadotropic substance. Summarizing his results, he states that he obtained correct results in 96.08 per cent of advanced pregnancies, in 94.45 per cent of early pregnancies and in 81.82 per cent of extra-uterine pregnancies and abortions. In the pregnant women in whom the reaction was at first negative, the test was repeated and now gave positive results. In view of this fact, the author concludes that a negative outcome of the test makes a pregnancy highly improbable. He admits, however, that the reaction is likewise positive in concentrated urines with reducing decomposition products of metabolism and stresses that efforts must be made to eliminate this source of error. If these efforts succeed, the percentage of correct results would be higher, and there would be a more rapid and less expensive method for the diagnosis of pregnancy.

Novyy Khirurgicheskiy Arkhiv, Dnepropetrovsk

33: 1-192 (No. 129) 1935. Partial Index

Surgical Study of Treatment of Cancer of the Lip. S. D. Narbutovskiy. —p. 3.
Comparative Leukocytosis in Differential Diagnosis of Acute Suppurative Surgical Conditions. Ya. I. Lipskiy.—p. 15.
Transplantation of Ureters After Method of S. P. Mirotvortsev. S. P. Shilovtsev.—p. 60.
*Clinical Aspects of Cancer of Colon. V. I. Mirer and M. M. Langer. —p. 76.
Torsion of Kidney. G. B. Teplitskiy.—p. 89.
Mycotic Splenomegaly. Ya. M. Pavlovskiy.—p. 100.

Cancer of Colon.—Mirer and Langer emphasize the importance of physical methods of examination in the diseases of the abdomen, particularly of palpation in various positions. Early resort to roentgenologic examination of the gastrointestinal tract and to exploratory operation are stressed. Colonic cancer may be operated on even in the advanced stage, because it grows slowly and is late in giving rise to distant metastases. Resection of the involved segment must be liberal, because of the fact that the colonic cancer extends not only locally but likewise along the length of the intestinal wall. The authors recommend that in cancer of the cecum the entire right colon and the right third of the transverse colon, and in cancer of the sigmoid the entire left colon and the left third of the transverse colon be resected. The subjective symptoms of colonic cancer may be grouped under the term "colic-like discomfort." Occult bleeding in the presence of colic-like discomfort constitutes a most suggestive sign of colonic cancer. In the neglected cases the cancer involves the peritoneum, spreads rapidly and gives rise to carcinomatous peritonitis. Clinical experience favors the one-stage operation, extending its indications even in the presence of manifestations of acute ileus. The authors prefer the side to side anastomosis, three rows of intestinal suture and covering the anastomosis with omentum or appendices epiploicae. The abdomen is closed tight and posterior incision is added when drainage is indicated. In one third of their cases the growth extended into the retroperitoneal connective tissue. Their late results were quite encouraging. The presence of carcinomatosis of the peritoneum constitutes an absolute contraindication to the radical operation, while fixation of the growth constitutes a relative contraindication, resection being occasionally still possible in the latter.

Nederlandsch Tijdschrift voor Geneeskunde, Haarlem

79: 5845-5912 (Dec. 21) 1935

*Rare Exanthem in Acute Polyarthritis. D. Van der Sande.—p. 5846.
Serioscopy. B. G. Ziedses des Plantes.—p. 5852.
Adductor Reflex. G. W. Kastein.—p. 5857.
Operation on Spinal Tumor Due to Amyotrophic Lateral Sclerosis. B. Stokvis.—p. 5860.
Intestinal Myiasis. J. E. A. M. Dierick.—p. 5866.

Rare Exanthem in Acute Polyarthritis.—Van der Sande gives the history of a boy, aged 5 years, who suffered during the last year from several attacks of acute rheumatic fever involving various joints and accompanied by hemorrhagic swelling of the eyelids and of the scrotum and hemorrhagic spots of different sizes on various parts of the body. He discusses the possible interpretations of this rare occurrence under three headings: (1) hemorrhagic diathesis, (2) erythema that turns hemorrhagic and (3) rheumatic polyarthritis with symptomatic hemorrhagic exanthem. He objects to an allergic classification of his case and concludes by stating that the main object of his report is to point out that hemorrhagic erythemas occur with or on account of acute polyarthritis, which, notwithstanding its grave aspect in the beginning, promptly responds to salicylate therapy.

Hospitalstidende, Copenhagen

78: 1205-1232 (Nov. 26) 1935

*Cystic Lungs. H. Kjærgaard.—p. 1205.
Investigations on Evaporation of Alcohol from Urine. V. Eskelund. —p. 1229.

Cystic Lungs.—Kjærgaard says that cystic lungs are a structural anomaly seen mainly as (1) large solitary tracheobronchial pulmonary cysts with symptoms of compression and, on infection, of fever and purulent fetid sputum, and dermoid cysts with symptoms of compression, hemoptysis and coughing up of hair, (2) superficial air cysts with simple pneumothorax on rupture and (3) honeycomb lungs. In extensive honeycomb lungs in the new-born, cyanosis and attacks of dyspnea occur; in honeycomb lungs in children there are recurring bronchitis and bronchopneumonia, and in adults symptoms of intermittent infection of the cysts with coughing, expectoration, fever, loss of weight and hemoptysis, leading to confusion with cavernous tuberculosis. The roentgenogram of honeycomb lungs is characterized by the peculiar system of large cavities separated only by thin walls, without fibrous infiltration in the lung tissue; interpretation of the roentgenogram is difficult in the infectious stage. Treatment of infected honeycomb cysts is as a rule the usual medical treatment given in bronchitis and bronchopneumonia. The author emphasizes that, while congenital pulmonary cysts may give rise to these symptoms, persons even with large and numerous cysts in both lungs may go through life without annoyance from them, and, except in the cases of extensive cysts in the new-born, trouble appears only if the cysts become infected or rupture.

78: 1233-1244 (Dec. 3) 1935

*Differential Diagnostic Significance of Fibrin Content of Blood Plasma in Diseases of Liver and Biliary Tract. T. Geill.—p. 1233.

Fibrin Content of Blood Plasma in Hepatic Disease.—Geill made 284 determinations of the fibrin content of the blood plasma according to H. C. Gram in 150 patients, mostly icteric, with disturbances of the liver or biliary tract, and asserts that fibrin values not exceeding 0.5 per cent point to diffuse disorder of the parenchyma (hepatitis, atrophy or cirrhosis of the liver, or extensive cancer metastases to the liver), while values exceeding 0.5 per cent indicate disturbances of the biliary tract and jaundice due to stasis (cholelithiasis, cholecystitis or cancer in the biliary tract and pancreas).

V 106
1936